

AUDUBON MAGAZINE

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John Lawrence Murphy

JANUARY-FEBRUARY 1942

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AUDUBON MAGAZINE

A BI-MONTHLY MAGAZINE DEVOTED TO THE PROTECTION
AND PRESERVATION OF OUR NATIVE WILDLIFE

Our Motto: A BIRD IN THE BUSH IS WORTH TWO IN THE HAND

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and GEORGE MIKSCH SUTTON

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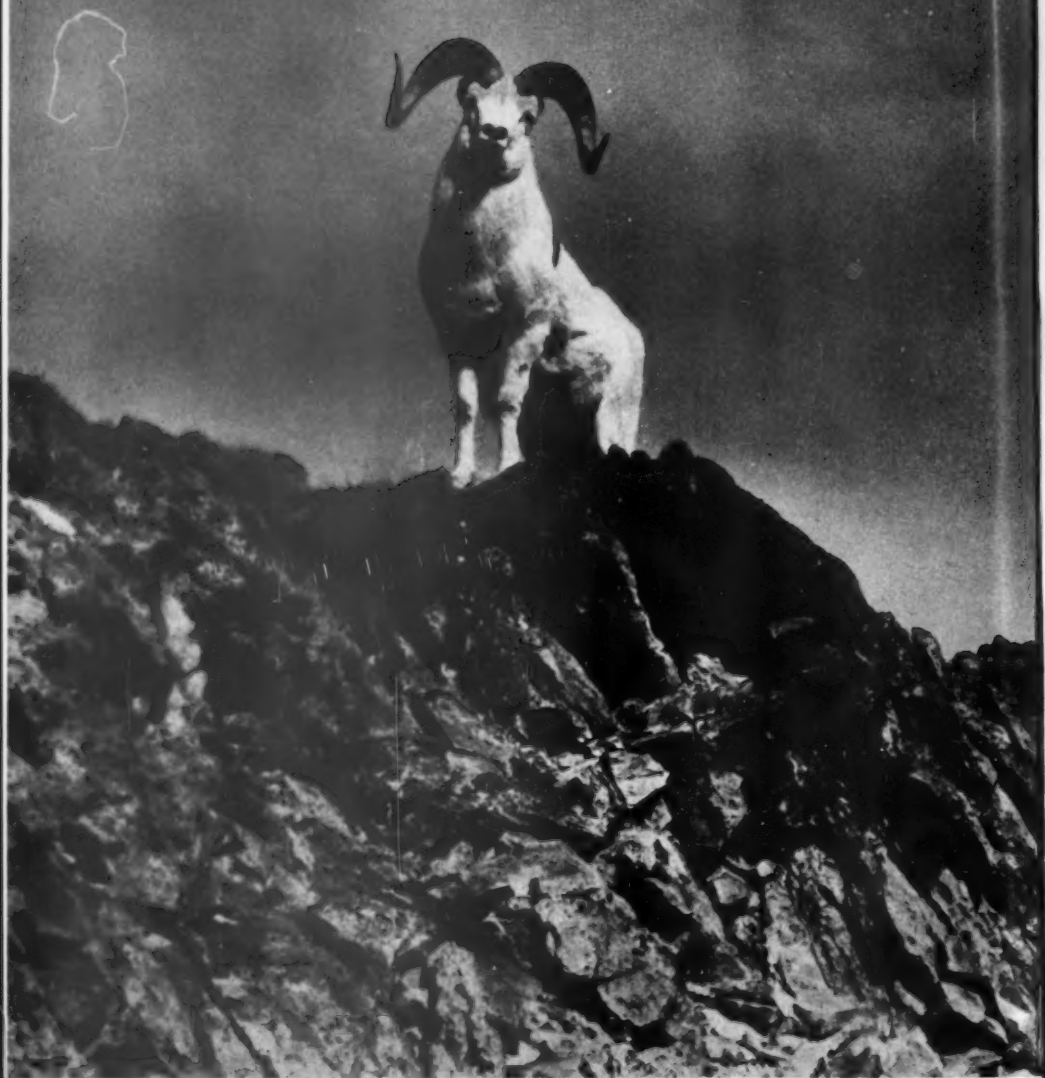


Photo by Adolph Murie

CLIFFS ARE ADORNED WITH THE WHITE ALASKA BIGHORN. *As with mountain sheep elsewhere, those of Mt. McKinley National Park are particularly adapted to life in rugged country.*

AUDUBON MAGAZINE

JANUARY-FEBRUARY, 1942

The Wilds Where the Caribou Roam

By Adolph Murie

IN 1906 and again in 1907 the late Charles Sheldon, hunter-naturalist, worked his way deep into the wilderness of central Alaska. He sought simplicity, solitude, the feel of weather, and a close acquaintance with animals in the remote mountains of the Alaska Range. The cabin he used as a base he built in a patch of woods near the last timber toward the head of the Toklat River, which has its source in glaciers lying along the crest of the range. This cabin is now in ruins and the cache is tottering. A porcupine is using one of the several log kennels he had built for the sled dogs. The Toklat River has washed away the woods up to the edge of the ruins, leaving them dangerously exposed. But the gravel bed of the river in front of the cabin is broad, perhaps a half mile across, so that it may be years before the stream again moves over to where the cabin stands.

During various trips down the Toklat in the course of my field work, I usually stopped at the cabin, lingered to examine the walls, the shelves, the wooden pegs used for nails. I would stand before the cabin and look across the gravel bars to the mountains, a scene that Sheldon must often have enjoyed. The cabin is deteriorating, a swing of the river may destroy it suddenly, but

I have a feeling it should be left alone. I think that Sheldon, with his love for wild places, would like to have his cabin crumble to earth with age.

This wilderness which Sheldon knew so well is now a part of Mount McKinley National Park. Largely through his efforts it was made a wildlife sanctuary in 1917. It stretches for over 100 miles along the Alaska Range and is from twenty to thirty miles in width. Most of it lies to the north of the crest of the range, including the foothills and some of the more level tundra beyond. McKinley, with its 3030 square miles, is our second largest park but is only a small fraction of the vast wilderness surrounding it.

Lofty Mt. McKinley is so remote and grand it hardly needs protection. It rises higher from its base than any other mountain in the world, about 17,000 feet, and is the highest mountain on the North American continent. Even without this dominating feature McKinley Park would be outstanding because of its alpine scenery, its Arctic vegetation, and because of its wildlife. I have walked over the green flowering slopes in the rain when the fog hid the landscape beyond a few hundred yards and felt that the white Dryas, the purple rhododendrons, and the delicate

bells of the heather at my feet were alone worthy of our efforts.

How often have people looked longingly to that northern corner of our continent, with thoughts of Arctic expeditions, glaciers, dog mushing, and far places? In McKinley Park, a choice portion of Alaskan wilds has been made accessible, and so far, mechanical facilities do not obtrude unduly. It is still possible to get away from camps and roads far enough to feel that you are in Alaska. And off there, alone among the hills, what manner of beasts will you find?

The animals all belong; they are original Alaskans. Alaska without caribou or ptarmigan would lack much of its character. Alaska full of transplanted elk and Chinese Pheasants would no longer be Alaska.

Alpine weather is especially unpredictable, so that because of sudden mists and enveloping clouds, a sight of towering Mount McKinley, the biggest thing in the park, cannot be assured the visitor who is in a hurry. Fully as unpredictable as the weather are the caribou, those long-faced, foot-clicking wanderers, that are said to have less home range than any other game animal. They are always on the move, much like the modern American, but perhaps to better purpose. O. J. Murie, in his monograph on Alaska caribou, has suggested that frequent overgrazing of lichens ages ago forced these Arctic deer continually to seek new feed grounds, until after centuries of such foraging they became the restless, migrating animals they are today. Lichens require many years to recover once they are grazed down. By skimming lightly over this favorite food of the caribou, continued growth is assured. So be not too perturbed today over the status of the caribou if you see few or none—they are probably swarming elsewhere.

[4]

There are several hundred thousand caribou in Alaska and a local herd of 20,000 to 30,000 wanders through McKinley Park each year. As many as 15,000 have been estimated in a single herd. The largest band I have counted contained 4000 animals, but most of the bands numbered one or two hundred.

The caribou are unique in several respects. Not only are they inordinately fond of lichens, but the females insist on carrying antlers. Even the calves grow a spike during the first summer.

One day, on a short trip after caribou movies, I took my five-year-old daughter with me. I had told her something of the peculiarities of caribou, such as the unique antlers, the pig-grunting sounds of the mothers and calves. It was June, and Gail had already seen the cows followed by long-legged, reddish brown calves with blackish squared-off muzzles. There were several bands, perhaps four or five hundred animals, on the slopes bordering a small tributary stream, and I wanted some mass action pictures. I tried to make our stalking as dramatic as possible. I told Gail that caribou do not see exceptionally well, but they have keen noses and we must be careful to be down-wind from the animals so our scent could not be wafted to them. She fell in with the spirit of the enterprise with elaborate enthusiasm. Presently she gave me some whispered advice: "Daddy, we'll have to close our mouths so the caribou can't smell us."

The technique had been stepped up!

A stupid animal, the caribou, is the opinion of hunters. "Yes, and a clumsy one," someone will chime in. "Look at the dainty White-tailed Deer, the graceful elk. There's no comparison!"

Granted, if you feel like making comparisons. In this streamlined age, I suppose the round hoofs of the cari-

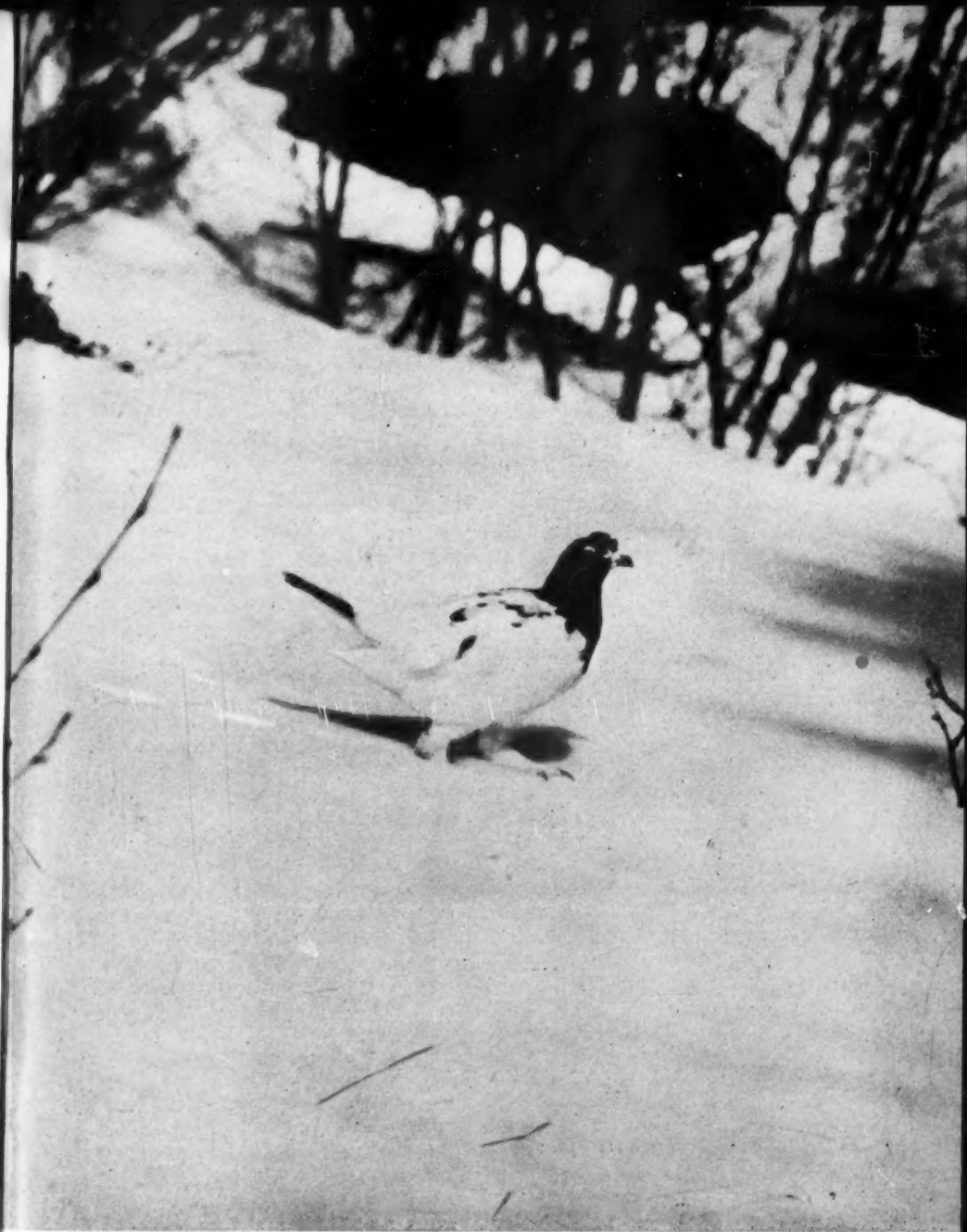


Photo by Adolph Murie

WHEREVER YOU GO YOU WILL FIND THE PTARMIGAN. *Visitors to Mt. McKinley are apt to meet the talkative Willow Ptarmigan first, occupying the lowest zone.*

bou, the long-muzzled, square-nosed face, are black marks against it—technically. But come face to face with a fine old bull in his fresh autumn uniform. His great antlers sweep back and up, with bez tines and with shovel-like brow tines out over the muzzle, all of these carrying numerous lesser points.

"The very angularity of the antlers is a mark of beauty," you breathe, if you take time at all to form your thoughts. Your eye runs over the shining white, massive neck, the low hanging white mane, the whiteness spreading over the shoulder and trailing along the flank in a white stripe. You will catch the contrasting dark brown; it will appear black on legs and face. Yes, even a white nose, and white bands above the feet. Suppose he hasn't seen you, and he wanders off slowly. Somehow, it doesn't occur to you to call him odd. Instead, you may let your eye take in the browns and greens and reds of the ripening tundra, the sweep of the slope over there, a glimpse of the river beyond, the snow-capped mountains against the sky. This is the caribou at home. You will want no comparisons.

Ordinarily, if you see him at all, you will see the caribou en masse; dun-colored objects sprinkled over a plain, or a mass of animals pouring over a ridge. In any case it will be a red-letter day.

In the middle of June a companion and I spent a typical day on a mountain slope on upper Teklanika River. The forks of the river head in glaciers in the main Alaska Range seven or eight miles above. Timber played out on the bars below us so that over most of the range we had an unobstructed view. Where we were the Dryas sod was a solid mass of the yellow-centered white flowers. It seemed improper to sit down in the midst of them, but there was no other place to sit.

We were classifying, by sex and age, bands of caribou passing up the gravel bars bordering the river below us. They would go eastward as far as Sanctuary River, then over a relatively low pass to the south side of the Alaska Range. After a few weeks they would all come back again. All day bands of varying size, from two or three animals to two hundred, passed on the gravel bars below us. I used the field glasses. My companion recorded the data as I gave them to him. There was a steady drone of "cow, calf, cow, calf, cow, calf, cow, cow, young bull, old bull, cow, etc." A total of 751 animals were classified. Over 3000 were seen but the majority were too far away or too bunched up for accurate classification.

Caribou are not the sole occupants of this land. During a lull in our counting we spied a fox along the edge of some trees below us, and presently there were several fox pups playing. Once a grizzly emerged from some timber on the flat and for some time fed on grass, then disappeared while our attention was directed elsewhere. He was probably taking a sleep among the willows. Another grizzly came into view on the slope across the river from us, but soon wandered into the spruces and was seen no more. It seems incongruous, a huge carnivore like a grizzly grazing like a cow. Yet they are chiefly vegetarians.

The white bighorns were in view all day. From where we sat we counted almost a hundred.

Then about noon there entered drama that was to make this a memorable day. In the distance a band of about 250 caribou, cows and calves for the most part, were coming our way at a gallop. Suspecting that they were being disturbed, I looked behind them through the field glasses and spied a black wolf. When the caribou reached the triangular open flat between the forks of the river the wolf began over-



Photo by Adolph Murie

A WILDLIFE SANCTUARY SINCE 1917. *Aside from being North America's highest mountain, Mt. McKinley is outstanding because of its alpine scenery, its Arctic vegetation and its wildlife.*

taking the rear of the band. But as he pressed them the herd fanned out to either side. The wolf continued straight ahead, and the caribou just ahead of him continued to spread to either side, so that he was making a lane through the herd. The caribou at the sides stopped to watch him go by.

On the flat the wolf stopped for a moment and so did the few caribou still ahead of him. Then he galloped on after a band of about thirty, which again fanned out, whereupon the wolf swerved to the left after fifteen of them. These started back in the direction from which they had come. He chased them for about fifty yards and again stopped. Small groups of caribou, some only one hundred yards away, almost surrounded the wolf. Why did they not try to get away from danger? A strange chase, this.

Then the wolf seemed to have come to a decision. He started after a group of twenty-five cows and calves, farther away than those he had just been chasing. He gained rapidly on them before they got under way. For a time the race seemed to be going quite evenly and I felt sure the caribou would out-distance their enemy. But this was my first view of such a chase. I was mistaken. The gap commenced to close, at first almost imperceptibly. The wolf was stretched out, long and sinewy, doing his best. Then I noticed a calf, unable to keep the pace, dropping behind the fleeing band. The space between the wolf and the calf decreased. The calf began to drop behind the herd more rapidly and the wolf increased his speed a notch, gaining steadily. The calf began to veer and dodge, and the wolf closed in.



Photo by Adolph Murie
FOX, RESIDENT OF MCKINLEY PARK. While counting caribou, it was not uncommon to spy several fox pups playing along the edge of some trees below.

THE WILDS WHERE THE CARIBOU ROAM

The chase had covered about 500 yards. The victim was about fifty yards behind the herd when overtaken. For some reason it was considerably slower than its brothers and sisters and lost its race for life.

Over a long period of years we have carefully selected the fastest of certain strains of horses, culling the poorest, breeding the best. But nature has been doing this, more slowly perhaps, but just as surely, long before man or his race tracks were thought of.

As a matter of fact, nature's molding process has produced the diversified fauna we find today in Mt. McKinley National Park. The cliffs and the high mountain meadows are adorned with the white Alaska bighorn. As in so many other animal forms in the North, the Dall Sheep is pure white, not only in winter, but in summer also. As with mountain sheep elsewhere, the Alaska sheep is adapted to life in rugged country. Away from the protection of cliffs it no doubt would eventually perish.

I often climbed the ridges along East Fork River to find bighorn. Going over the first ridge one enters a fairyland of green slopes. There are delicate yellow Arctic poppies, many kinds of saxifrages, monkshood, the ever-present *Dryas*, spring beauty, and many others, each in its chosen habitat, be it rock crevice, mossy tundra, or shaly slide. But what always impressed me was the sheer greenness of the surrounding slopes.

There were always many rams in these lofty pastures, mainly old fellows, with long gracefully curved horns. There is something intriguing about a mountain sheep horn, something about its sweep that satisfies our sense of smoothness, and the ruggedness of its surface gives it character. The horns of the white sheep are especially free in their sweep, relatively slender, and often have a lovely amber hue.

The rams would feed on the gentler slopes, then retire to the terraced ledges which here and there break the green. Or they would lie on the smooth slopes, or one of the numerous knolls on the ridges. Frequently there were a hundred rams to be seen, and once I counted 180 on two adjacent ridges.

No bighorn range is complete without the Golden Eagle, and it is an important part of the picture in McKinley Park. On one of the cliffs in the ram pasture a pair of eagles has nested year after year. Much of the time Golden Eagles were seen skimming along the contours of the hills, seeking ground squirrels, their staff of life in summer.

Up there on the bighorn ranges one might see another rarity, the Surf-bird, not generally encountered along the usual travel routes of tourists. Until recent years the nesting of this bird was unknown to science. Then in 1922 a newly hatched young bird was discovered by O. J. Murie in the Forty-mile country of east central Alaska. This gave the clue to the secret and the following year I saw the birds in McKinley Park. Then, in 1926, Joseph Dixon and George Wright found the first eggs in McKinley Park. Even yet that one downy young and that one set of eggs are the only ones existing in scientific collections. These discoveries show that the Surf-bird, found in winter on rocky, surf-beaten shores of the Pacific, goes to the high Alaska mountains to nest.

McKinley Park plays a part in another interesting discovery. On the present expedition I found a nest of the Wandering Tattler, the second nest known to science. In 1922 my brother had found the downy young in McKinley Park. The following spring he and I found the first nest. We learned that this bird seeks the gravel bars along the streams to nest, more as we expect

a shore bird to do. And these birds can be seen by the park visitor, if he looks along these streams and knows what he is looking for.

Space does not permit lingering over each one of the birds and mammals of this Alaskan park. In the mountains one has a flash of a Snow Bunting, or a Rosy Finch will be picking in the shale. The handsome Wheatear, with its curtsy, builds its nest in a rock crevice. When I came to the nest of a Wheatear the male would often hover in the air, fluttering its wings like a Sparrow Hawk or tern, mainly, I thought, to keep watch on what I was doing. Then, too, I might be startled by the piercing whistle of the Hoary Marmot, the big grizzled cousin of the common woodchuck, which has chosen the high country of the bighorn.

But wherever you go, in the bottomlands or mountain-tops, you will find the ptarmigan. And with its customary prodigality, Alaska furnishes three distinct species, all being found in McKinley Park. The visitor is likely to find the Willow Ptarmigan first, occupying the lowest zone, if we can designate ptarmigan zones. At any rate it is often found in the willow country, though it also ventures up the slopes. This is the talkative one with the guttural voice, sending into the spring air its loud rattling crow. We hear it apparently saying, *come 'ere, come 'ere*. Then again it might be *go back, go back*, or whatever interpretation the listener might put on it.

The Rock Ptarmigan is somewhat smaller, overlaps the range of the Willow Ptarmigan, but is more inclined to seek open, brush-less country and to go higher up the mountains. Its call is much different, more subdued, a low croaking sound hard to describe.

Then, highest of them all, sometimes up in the rocks at the limit of all vegetation, is found the White-tailed

Ptarmigan, the smallest and rarest of the three. Its call is a harsh scream, it always seemed to me. All the ptarmigan are quite tame, but this one is especially confiding. Once a family of them wandered over to where I was sitting. I caught one of the young, and when I set it down it continued feeding near me, not at all frightened.

One day two employees of the Alaska Road Commission told me about a bird which they thought was nesting near the road. From their description I guessed it must be the Golden Plover in its summer dress of black and gold, trimmed with white. What a subject for Kodachrome! Following their directions I found the nest on a Dryas slope, beside a tuft of grass. Later, in a similar situation not far away another nest was found by Maude Hosler, the postmistress at McKinley Park. Whenever we approached the nests, the parent birds were in a terrible state with broken wings and all, and they would come within four or five feet of us. These Golden Plovers were one of the topics of conversation among the local residents, who, by the way, are unusually wildlife-minded. When the eggs in the two nests hatched, the information was relayed around so that nearly everyone saw the mottled fluffy young, and marveled at the greenness of the down on their backs!

Not far from that place a pair of Long-tailed Jaegers incubated two greenish-brown eggs. One young, which looked like a gray squab, hatched a few days before the other. My daughter always coöperated cheerfully in obtaining pictures. This time Gail became a martyr of a sort. I asked her to approach the young birds while I stood back with the camera. Both parents swooped at her and hovered over her, calling sharply, and I got my pictures, but they left a few gentle pecks on her head.



Photo by Adolph Murie

SHEEP TRACKS IN THE SNOW AT POLYCHROME PASS. *McKinley is our second largest park but is only a small fraction of the vast wilderness surrounding it.*

We were not the only intruders causing the jaegers alarm. One day a number of caribou wandered past and the jaegers excitedly swooped at them, urging them to go elsewhere.

What a wealth of fauna in this wilderness park! Many other creatures deserve special study, and enjoyment, but cannot all be even mentioned—such as the Alaska Longspurs, the Harlequin Ducks, the Old-squaws, and the Short-billed Gulls, some of them nesting in trees. And what about the Gyrfalcon high in the crags, and the elusive wolverine, the beast of mystery? And may I include among these semi-exotic creatures our own familiar Robin,

pouring out in the spring air of central Alaska his well-known joyous music?

Not long ago I was driving out from a ranch in Jackson Hole, Wyoming, under the towering Teton Range, itself no mean habitat for an abundant fauna. It was an overcast, rainy day; the cottonwoods of the bottomland still clung to their withered leaves. Gail evidently felt depressed, and missed her grizzlies and caribou and the head-pecking jaegers. "I don't like this country," she said. "There's nothing to see. Just those old spoiled trees," pointing to the stark cottonwoods.

Childish nostalgia! What has the Alaska wilderness stored in her memory?

Lake Okeechobee Sanctuary

By Alexander Sprunt, Jr.

OKEECHOBEE . . . Big Water! Surely the Indians understood descriptive language. Many translations of their beautiful names give evidences of it, and few more so than this one. What more appropriate term could be chosen for this second largest fresh-water lake in the country? "Big Water?" Yes, seven hundred square miles of it! The Seminoles knew whereof they spoke.

Though encircled by highway, more than half way dyked, with limitless fields of cane and truck about its southern and eastern rims, Florida's Lake Okeechobee is largely unknown to the average tourist who glimpses its wide waters. Nor do the transient vegetable pickers, crop growers and shippers themselves know it well. Only the fishermen, that hardy group of natives, to whom heavy toil and exposure are daily grinds, understand its moods and erratic, often treacherous waters. It is a shallow lake in the main, and therefore subject to sudden squalls and storm; when infrequent hurricanes sweep across it, it is overwhelming in its wrath. Everything about it is big, and to many who see it, strange and somewhat forbidding in its vastness, but to others who have witnessed its eccentricities, its combination of tranquillity and violence, its undoubted beauty and teeming wildlife, there is a fascination about the Big Water that produces a nostalgic longing to experience again days along its shore, and upon its surface.

Like the mysterious Everglades, which for centuries it fed and nourished, the lake has changed much in recent years, but there is still that wilderness quality, that limitless reach of horizons and capricious interpretation of the moods of nature, which one sometimes gains from the Great Plains; the same realization of enormity and transcendent, untamed forces beyond our ken.

While perfectly open water for much of its huge expanse, Lake Okeechobee does have a few large islands which are cultivated and inhabited to some extent, these lying off the southern and southwestern shore line. However, many smaller ones appear elsewhere, as off the northern rim, and are nothing more than stretches of cane, heavy grasses and cattails, with no dry land whatever. These are known in native parlance as 'reefs.' Occasionally, beds of willows appear in this growth, and great patches of water-hyacinths, lilies and similar aquatic plants hide the water for acres and become a glory of bloom in the spring. Amid such flourishes the reptilian life of the lake, represented by the steadily diminishing alligator and numerous snakes, among which occurs the venomous water (cotton-mouth) moccasin. Sandy bars, created by dredging operations connected with the construction of the great dyke erected as a hurricane barrier, appear here and there, now utilized by thriving colonies of terns.

Remarkable examples of avian dis-



Photo by S. A. Grimes

COMICAL BLACK-NECKED STILTS FIND SANCTUARY AT OKEECHOBEE. *An abundance of other sea and shore birds occur in season about this great inland lake.*

tribution exist in Florida, and are nowhere better illustrated than in this general area. Birds occur here that are not only largely absent from any other part of the State, but the whole country as well. Others live here that are represented in other parts of the United States, but in very distant parts of it, with none occurring in between. Examples of the former are the Glossy Ibis and Everglade Kite; of the latter, the Caracara, Burrowing Owl and Florida (Sandhill) Crane. Little wonder that Florida is such a mecca for bird observers!

The lake itself is highly conducive to a large avian population because of the presence of all essentials necessary to a bird's existence, *viz.*, an abundance of food, water and cover. Herons thrive because of the swarming min-

nows, frogs and small snakes; ibises congregate because of the many crawfish; ducks find extensive beds of aquatic plants, roots, tubers and seeds. Gulls, terns, shore birds and White Pelicans, as well as Ospreys and eagles, aid in maintaining the balance of finny life amid the waters, while such highly specialized feeders as the Everglade Kite and Limpkin are constantly supplied with their chosen item of diet, the large fresh-water snail, which unconsciously pursues its existence under no other name than its scientific cognomen of *Pomacea caliginosa*.

The only river of any consequence which empties into the lake is the Kissimmee (accent on the *second* syllable) and from its mouth on the northern shore, the marshes and wil-

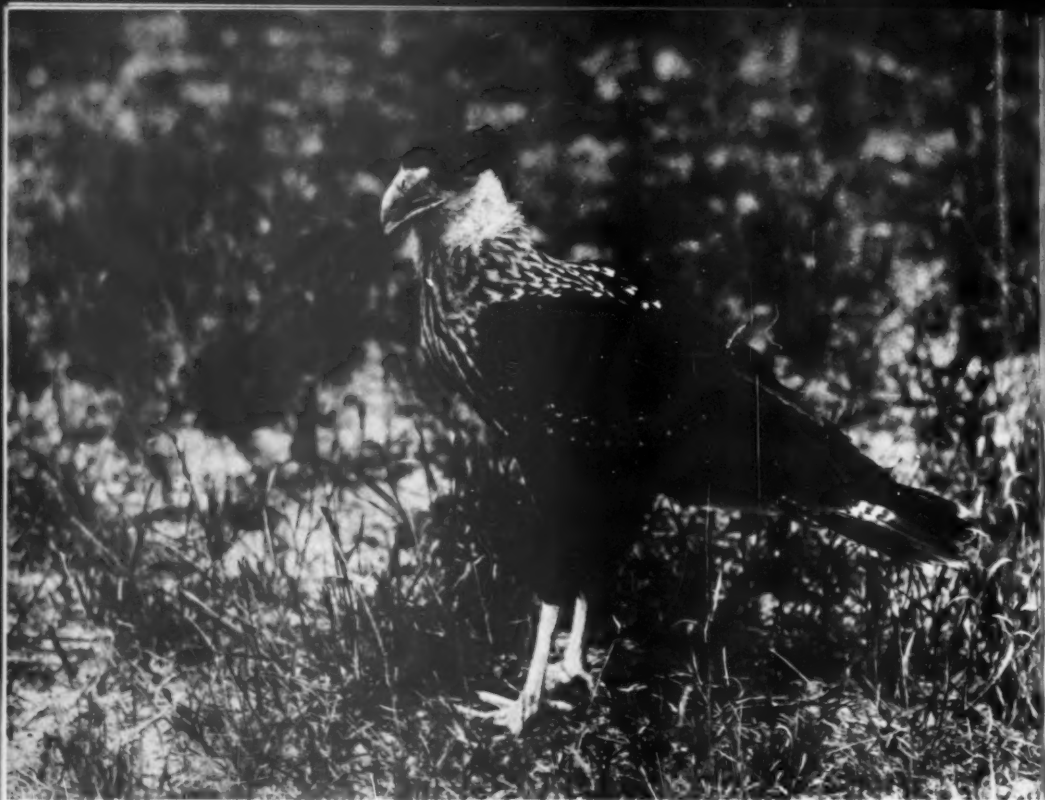


Photo by Allan D. Cruckshank

OKEECHOBEE'S BIRD LIFE IS UNIQUE. *Caracaras search for turtle eggs and snakes along the Lakeport Road; one must go to Texas to see them outside of this area.*

lows following its many bends also harbor a bird life similar to that of the lake itself.

Standing back three miles from the northern apex of the lake is the metropolis of that big-water, big-prairie country, Okeechobee City. Subsisting largely upon cattle and fish, two great products of land and water, it is a town which finds a counterpart in many a far western State. Wide-streeted, booted and saddled, Okeechobee hoped for great things from the Florida boom which did not materialize; but it is a cordial, settled and substantial community which knows more about wildlife conservation now than it did five years ago! Here are headquarters for the Audubon Wildlife Tours of that region, as well as the warden patrols of lake and

prairie, and many scores of visitors from scores of States have come to hold it in happy memory.

For some time prior to the spring of 1936 many stories had been coming to the New York headquarters of the National Audubon Society about this country. Stories of the activities of collectors who were taking skins and eggs of species already much reduced, and therefore the more eagerly sought; of how many people were making free with ibises, Limpkins and cranes for food, and the existence of general laxness of game-law enforcement. With these stories in mind, the writer went to the Okeechobee country early in 1936, seeking a man highly recommended as a guide. He found him—a typical specimen of the country, six feet of wiry manhood, iron constitu-

LAKE OKEECHOBEE SANCTUARY

tion and bronzed experience . . . Marvin Chandler, of the great open spaces. For days he roamed lake and prairie with this competent, genial guide, and found that the stories were true. There was need for Audubon protection for the wildlife, and plenty of it. Consequently, shortly afterward, conservation descended upon the Okeechobee country and Marvin Chandler was charged with the responsibility of a vast patrol, the first Audubon warden to work in that region.

The State of Florida owns a good deal of the shore and marsh areas, and in recent years the maintenance of a sanctuary on a large section of the northwestern shore of the lake has been the responsibility of the Society under the terms of a resolution of the Trustees of the Internal Improvement Fund. Here, the home of many birds is posted and patrolled the year round, and it is this extensive block of marsh and water that is known as the Okeechobee Sanctuary. Patrol of the area is carried on by Chandler by means of an outboard motor skiff for water work and a semi-amphibious Ford for land reconnaissance. He is genial and informative, answering many questions and making friends for the National Audubon Society.

Probably this sanctuary is known to more visitors than any other in the whole chain of southern refuges, for here, during the winters of 1940 and 1941, were conducted the two-day trips which constituted the Okeechobee Tours of the National Audubon Society. In these two seasons, during February and March, nearly three hundred people saw the remarkable avian shows staged daily along the roads and marshes. They constitute as varied and animated a panorama of bird life as exists anywhere within the limits of that natural wonderland

called Florida. Perhaps you have heard the term 'birding de luxe.' Well . . . this is it!

Because of unwise drainage, the advances of civilization and a variety of other contingencies, some forms of bird life are making of Lake Okeechobee their last stronghold. It is imperative that they be given every opportunity to rehabilitate themselves. This is particularly true of such species as the Everglade Kite and the Glossy Ibis. Only scattered pairs nest elsewhere in Florida and the last real nucleus is here. To a lesser extent this applies also to the Limpkin, that strange combination of crane and rail with the amazing voice. Nowhere in this country does it occur outside of Florida, and nowhere in Florida as it does along the Okeechobee shore.

The status of other birds is more firmly established. All the herons of the country, aside from some sub-specific forms, live about the lake with the exception of the Great White, and even it sometimes strays up from its normal haunts among the Keys. Similarly, all the American ibises nest on the grassy reefs or in near-by cypress hammocks. Caracaras search for turtle eggs and snakes along the Lakeport Road (State Highway 29), and to see them outside of this area, one must travel to the central and southern coast of Texas. Burrowing Owls pop up between the cattle-guards of this fascinating highway, and to find them outside of Florida would necessitate a journey west of the Mississippi River. Riding in stately splendor on the lake itself, or wheeling in tremendous circles above the marshes, squadrons of White Pelicans catch the sun on their glistening plumage, although they never nest east of the Father of Waters, and only rarely this side of the Rocky Mountains. Yet these great birds 'choose' to winter

regularly in the Land of Sunshine, and may be counted on as appearing in at least three parts of Florida during the cold months in considerable numbers.

Situated as it is, in the interior of the State, one would not ordinarily expect many sea or shore birds about the lake. And yet Black-necked Stilts and Dowitchers; Pectoral Sandpipers and Killdeer; Yellow-legs and Wilson's Snipe are seen seasonally, as well as others of the plover and sandpiper tribe. Herring, Ring-billed and Laughing Gulls are common on the lake; Gull-billed and Forster's Terns are dwarfed by Royals and Caspians, while Florida Cormorants, Water-Turkeys and Pied-billed Grebes contest each other's ability in aquatic maneuvers.

Among the land birds, variety is also marked and one is rarely out of sight of Boat-tailed Grackles, Loggerhead Shrikes, Ground Doves and Southern Meadowlarks. In the cypress 'heads' where tall, gray-green trunks soar skyward, bannered with swaying moss, Yellow-throated Warblers and Tufted Titmice live. The 'cabbage hammocks,' those great islands of palmettos amid seas of prairie grass, harbor Pileated Woodpeckers and Florida Barred Owls. Pinelands echo to the notes of White-eyed Towhees, Cardinals and Brown-headed Nuthatches, while Mockingbirds pour out their matchless melody everywhere.

As for hawks . . . it makes one feel there *are* really some left after all. What would you think of twenty-seven Red-shoulders in twenty miles? And thirty-seven Sparrow Hawks in thirteen miles? Occasional Red-tails, rarer Duck Hawks, numberless vultures of both species, frequent eagles and even a wandering Rough-leg are to be seen daily. Truly, this is a hawk country.

Last, but by no means least, there are ducks! Parts of the lake are time-honored shooting grounds for these wildfowl and the popularity of their pursuit reaches far and wide in Florida. Hunters converge on Okeechobee from east- and west-coast towns, as well as the central portion of the State, and compose quite a transient population of Okeechobee City during the open season.

Okeechobee does not boast as great an assortment of species as other parts of the southern wintering range but individuals are numerous of those that do occur. Lesser Scaup and Ring-necked Ducks usually predominate, followed by Pintail and Baldpate. Blue-winged Teal and Shovellers are not uncommon, and now and then a few Canvas-backs appear. Two species, the Wood Duck and Florida (Black) Duck occur the year round.

After the shooting season, ducks become very tame and the many ponds dotting sides of the Lakeport Road are favorite feeding spots. Here, the visitors on the Audubon Tours can study scaup, teal and widgeon to splendid advantage not only with their own binoculars but through the telescope that is always taken along.

The Okeechobee Sanctuary is thus fulfilling numerous needs and affording many the opportunity of seeing what an Audubon refuge is, and how the wardens operate. Rare, locally distributed birds are under constant watch and their nesting, feeding and roosting places patrolled. Others, living in close proximity, have the same care, and transient and winter birds as well come under the protective schedule seasonally. And all the while, there is a steadily growing understanding of the vital need of conservation and realization of the value of wildlife assets, among people living in this world of animated nature.



The Nature of Things

By

DONALD CULROSS PEATTIE



BY THE time you read these words, Santa Barbara will have been honored as the convention city, in January of 1942, of the various Audubon societies of California. The wit, youth, and beauty of Pacific Coast ornithology will have flitted a while in our ancient streets and then gone its May-fly way, leaving a tender smile on the creased visage of this historic town.

Yet it has its own memories, *per Bacco!* It boasts that in April, 1836, good old Thomas Nuttall arrived from the Sandwich (Hawaiian) Islands in the ship *Pilgrim*, on which Dana was serving his two years before the mast. Dana found romance here with a senorita, but little bachelor Nuttall confined himself, in California, to the discovery of six new species of trees and two birds new to science, the Yellow-billed Magpie and the Tricolored Red-wing.

It was in Santa Barbara that Dr. William Leon Dawson lived some of his last years while he wrote 'The Birds of California,' perhaps the most monumental work ever devoted to the ornithology of a single State.

And some time after the Santa Barbara Museum of Natural History was formed out of the original Museum of Comparative Oölogy, Ralph Hoffmann became its director. You will remember him, if you live in the East, as the author of 'A Guide to the Birds of New England and Eastern New York,' and in Stockbridge, Mass., his memory is still green. From his family I learn that when Matthew

Arnold was visiting the *Atlantic Monthly* Sedgwicks in Stockbridge, he asked who in the neighborhood knew all about birds and plants, for he would like to take a walk about the Berkshire hills with him. Everyone said Ralph Hoffmann was the very man and so Hoffmann was duly sent for. When he presented himself before the famous English poet, Arnold opened his eyes. Ralph was ten years old.

Now, the Berkshires are lovely, and the birds in them are fair. But it does a man a world of good to get away from home, even a New Englander; Thoreau himself was brightened more than he ever realized by breaking away from Concord for a bit.

So that when Hoffmann first saw the Grand Canyon and its birds he hit the sky with excitement. For there is nothing like a new avifauna to rouse the liverish blood of an ornithologist: Hudson became a writer because he changed venue from Argentina to England; Muir was made articulate when he swapped Wisconsin for California; and when Audubon left France and came to Kentucky a great artist was born.

Even thus did western bird life excite Ralph Hoffmann. The fresh new scenes caused him to produce a superlative little book, 'Birds of the Pacific States,' which to my mind is far fresher than 'A Guide to the Birds of New England.' For conciseness, for the very feel of California bird life, this book has not been equaled.



Photo by Allan D. Cruickshank

PROUD BOAST OF THE SANTA BARBARA REGION—*variety of habitat and corresponding variety of bird life, and mountains crowding close to the sea.*

Ralph Hoffmann fell to his death while exploring some cliffs on San Miguel Island in 1932. It was a dreadful loss to our beautiful little museum, and strangely like the death of Cabrillo, the Spanish explorer who discovered those mysterious islands just off Santa Barbara. He, too, fell to his death on one of them in 1542—just fifty years after the discovery of the Western Hemisphere by Columbus.

♦ ♦ ♦

The charm of the Santa Barbara Museum of Natural History, chosen for the meeting place of the Audubon Convention, is that it is so small that one can enjoy it all without fatigue. For it sets out to cover, as a local museum ought to do, nothing but the local biota. The result is a little gem; I don't believe that any other small city in the country has so beautiful and handy and compact a natural-history museum, with its Indian collections, its mineralogical, mammalian, and ornithological exhibits, its herbarium and beautiful

lecture hall and library. In particular the bird rooms and the mammal room are unmatched. Much of the collecting, taxidermy, mounting, and habitat exhibit are the work of a wizard of a fellow, Egmont Z. Rhett.

One of the features of the main bird room is a series of case exhibits of birds' eggs and nests. I've seen this done elsewhere. But why, I wonder, does it elsewhere always look so dingy and dull, this science of oölogy? Only here is it well done, to my taste. The interest and beauty of bird life seem doubled by this exhibit, which, I understand, was brought into being out of stored materials, by the initiative of the new director, Arthur Coggeshall.

♦ ♦ ♦

The variety of bird life in any given spot is largely determined by the variety of habitats. A monotonous wilderness, however grand the scenery, however remote from man's despoiling hand, is not nearly as rich in its avifauna as a quite ordinary and civilized

THE NATURE OF THINGS

setting where, along with woods there are meadows, farms, orchards, ponds, lakes, brooks, marshes, brushland and even garden and lawns. Santa Barbara has all these and with them it has a combination never found on the Atlantic Coast, of mountains crowding close to the sea. So that you get here salt marshes, estuaries, dunes, sea rocks, sea cliffs and islands suitable for sea-bird breeding as well as the bird life of the open ocean—and a range of mountains rising four thousand feet above sea level, which presents you with a distinctly montane fauna.

Result: Santa Barbara County boasts the last stand of the California Condor, in the most inaccessible mountains of the interior; yet on the chain of sheer-sided islands off the coast, there breed the chittering Pigeon Guillemot, the Xantus's Murrelet, Cassin's Auklet, and the Tufted Puffin.

The proudest boast of Santa Barbara ornithologists, however, is the length of its Christmas Bird Count. Here are some Christmas high records: San Francisco, 100 species; St. Petersburg, Fla., 111; Los Angeles, 121; San Diego, 125; Charleston, S. C., 139; Harlingen, Texas, 155; and Santa Barbara boasted 137 species. This leaves Santa Barbara just about at the top of the list for stations in the United States.

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Scientific circles and literary alike are going to get a jolt when they crack open 'Sea of Cortez,' the joint work of John Steinbeck—he of 'The Grapes of Wrath' and 'Of Mice and Men,' and of Edward F. Ricketts, of the Pacific Biological Laboratories on Monterey who wrote 'Between Pacific Tides,' a popular treatise on west-coast tidepool animals. For these two unexpected friends have combined, in one book of 600 pages, a severely

systematic account of animal life of the Gulf of California, with a most delightful, original, and unorthodox log of the good smack *Western Flyer* which took the novelist and biologist and a motley crew to the lazy yet treacherous waters of our New World Red Sea sometime since. And when you read it you, too, will want to go lazing up the 'sea of Cortez,' amid coral reefs and desertic islands, dropping anchor off sleepy tropical towns and collecting curious things where less collecting has been done than in any other waters so close to civilization.

But I don't know just how orthodox scientists will survive the shock when they hear Messrs. Ricketts and Steinbeck demanding that Latin nomenclature be dropped and, instead, a number like an auto license plate be adopted. Thus the Mexican sierra fish would become D.XVII-15-IX; A. II-15-IX. Capital letters are to stand for phylum, roman numerals for class, small letters and arabic numerals for family, genus, species, and so on. It's all very logical. But a number, however significant, can never be a name; it is the antithesis of a name—ask any penitentiary inmate—and is usually very much harder to remember than the most difficult name. To substitute for zoölogical nomenclature a zoölogical numerology would please no one more than those scientists who want to wrap their findings in impenetrable symbols.

Be it understood, this is not a review of the 'Sea of Cortez.' The literary papers have already reviewed Steinbeck's and Ricketts's book, and perhaps a few of the scientific journals (which are always weeks and months tardy on their review schedule) will get around at last to picking the book up with the tongs. For it's dynamite to the conventional scientific mind.

It says that there are as many dull, mediocre or downright stupid men teaching in our colleges as there are selling nails. It states that scientists have to have degrees and Greek letter honorary societies, and mortarboards and purple-lined commencement gowns, for the same reason that butchers and hardware men have to have Masonic offices and trappings—to keep from feeling how small they are.

These authors put popularization of science on a rank equal to or exceeding pedantification of science. And more, in the same boisterous vein, for 250 pages! They assert that it is pompous self-deception when scientists tell themselves that their work has as its motive the welfare of humanity. Ricketts and Steinbeck have psychoanalyzed their motives. They confess: "The animals were very beautiful. Here was life from which we borrowed life and excitement. In other words, we did these things because it was pleasant to do them."

Which would not have shocked that first marine biologist, Aristotle of Athens. In his 'Ethics' he asserts that we do everything because, directly or indirectly, we find it pleasant. As we grow wiser we learn to ascribe lofty reasons for our acts.

But what will the scientific reviewers have to say to this? I shudder.

* * *

And I am led to say that the worst reviewing on earth is usually that done by scientists. The purpose of a book review is to tell the reader of it what the book is about, in such a way that he can decide whether he wants to read or buy it. It is of no interest to the reader to hear the reviewer show off how much he knows about the author's own subject, or to see him settle a private grudge with the author over a pet theory.

[20]

But most scientific reviewers have never grasped these simple rudiments. We review books the way teachers correct their students' themes, passing the principal content by and dwelling on details taken to be errors—on the often unfounded assumption that the author is wrong and they themselves right. If they have any minor details to correct, reviewers should put them in a private letter to the author, where their shame should they, the reviewers, be proved wrong, will not be on record against them for all time. It is bad to make a mistake, worse to contradict a man mistakenly!

I read in scientific reviewing the most justly unforgiving chastisement of errors, minor or major. But I never yet have heard a scientist roast another for complete unoriginality, though the majority of scientific books on any one subject are palpably the same old stuff. But I suppose every eminent professor has to bat out a book of his own; every botany teacher in the country gives his elementary course in book form, though why one is better than another I can't make out.

And I never heard a reviewer complain that a scientific author's book was dull. Yet the majority of such books are about as potable and sparkling as dish water. So far from considering this a sin, scientists tacitly approve it. It makes some of them feel homey—as if they were listening to one of their own lectures.

Finally, we are guilty of the cardinal heresy of all criticism: we blame an author for not writing some other book than he meant to, or we actually review a book he has not, but we would have, written.

"In every work, regard the writer's end,
Since none can compass more than they
intend,
And, if the means be just, the conduct true,
Applause, in spite of trivial faults, is due."

Life Zones, Biomes, or Life Forms?

By Roger T. Peterson

WHEN Dr. Clinton Hart Merriam and his colleagues climbed San Francisco Peak in Arizona, a half century ago, they found that the bird and animal life changed as they climbed. When they left the low desert, many species dropped out of the picture. New ones replaced them among the piñon pines, and others, not seen before, appeared when they reached the cool fir forests. The birds and animals seemed to be tied up in some way with the plants, an obvious fact that many naturalists had noticed long before; but Merriam strove for some sort of order or system by which he could describe the distribution of these plants and animals. He separated the area around San Francisco Peak into seven major zones: 1) Alpine; 2) Subalpine (timberline); 3) Hudsonian (spruce); 4) Canadian (balsam fir); 5) Neutral (pine); 6) Piñon pine; 7) Desert. The first four zones had certain affinities, certain northern influences in common. These he designated as the Boreal division—zones 6 and 7 had certain southern tendencies in common, and were called the Sonoran division. Zone No. 5, the Neutral Zone, represented a merging of northern and southern influences. This was later to become known as the Transition Zone.

In explaining the reasons of the zones, Merriam stated that "temperature and humidity are the most important causes governing distribution, and that temperature is more potent than humidity."

Within the next several years Merriam extended his system to include all

of North America until he had arrived at the zonal terminology that we all know so well:

I. BORREAL REGION

- 1 Arctic-Alpine Zone
- 2 Hudsonian Zone
- 3 Canadian Zone

II. AUSTRAL REGION

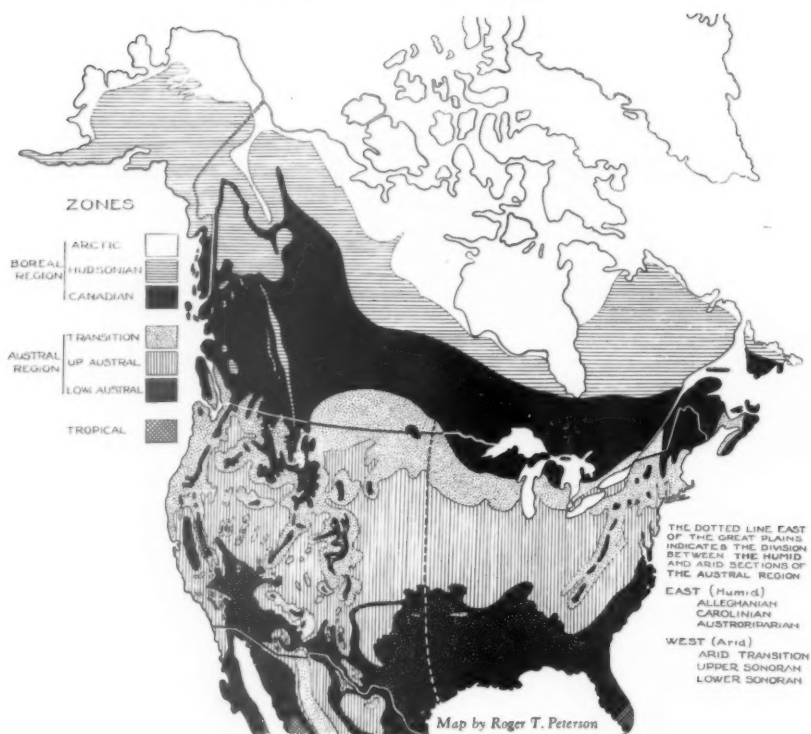
- 1 Transition Zone
 - (a) Alleghanian Faunal Area
 - (b) Arid Transition Faunal Area
 - (c) Pacific Coast Faunal Area
- 2 Upper Austral Zone
 - (a) Carolinian Faunal Area
 - (b) Upper Sonoran Faunal Area
- 3 Lower Austral Zone
 - (a) Austroriparian Faunal Area
 - (b) Semitropical Faunal Area
 - (c) Lower Sonoran Faunal Area

III. TROPICAL REGION

Dr. Merriam's Work Is Questioned

For years we have used these terms. Book after book and list after list have been published, all faithfully following Merriam's temperature concept in describing the distribution of birds. Rarely has the plan been questioned by birdmen, even though they noticed that, while some birds fitted the different classifications fairly well, others did not conform at all.

Lately, Dr. Merriam's work has been criticized by many biologists. One objection was that his zones extended from the western mountains right across the Great Plains to the eastern mountains and the coast. This meant, then, that the great grassland region, which stretches up through the center of the continent from the Gulf of Mexico into Canada, was divided into three zones. Each zone was linked



The Life Zones of North America (after Merriam)

with one or more very different types of vegetation on either side of the grassland belt. In the Transition Zone, for example, the grassland is tied up with pine forest and sage brush to the west and with deciduous forest to the east. This is hardly reasonable, as it would logically infer that this sector of grassland is more closely related to these other kinds of plant growth than to the rest of the grassland to the north and south.

Merriam based his logic on the idea that average temperature is the controlling influence on plant growth and his zonal maps were consequently based on temperature summations and their isotherms. But experimenting botanists have recently found that

temperature summation has no great significance, and that temperature extremes have much more influence on plants, especially the lowest winter temperatures.

Dr. S. Charles Kendeigh has pointed out that Merriam himself admitted, through some kind of misunderstanding with the Weather Bureau, that he had taken 0°C . as a threshold value in the summations rather than 6°C . Dr. Kendeigh adds that the agreement of Merriam's zones with this faulty data should be proof enough of the invalidity of his summation law.

These are only part of the criticisms leveled at Merriam's work. A more complete summary of them from different sources will be found in a splendid

LIFE ZONES, BIOMES, OR LIFE FORMS?

article by Rexford F. Daubenmire entitled 'Merriam's Life Zones of North America' (*Quarterly Review of Biology*, Vol. 13, No. 3, Sept. 1938, pp. 327-332). But though Merriam's life zones may have been found faulty in some ways, they represented a great step forward, and there is still much of his idea that might be retained with a little modification.

What Is a Biome?

Botanists, pulling away from the life-zone idea, gradually arrived at the *biome* concept. Biomes are, according to Shelford, "the largest plant and animal communities in dynamic equilibrium in the final climax state." To put it in a way that can be grasped more quickly, biomes are the major landscape units, such as grassland, deciduous forest, coniferous forest, tundra, etc. Between each is a broad transition band where the biomes blend. These are called *ecotones* (confound these ecological terms!). Thus aspen parkland of our western foothills becomes the ecotone between the coniferous forest biome and the grassland biome, and mixed or sub-Canadian woodland becomes the ecotone between the coniferous forest biome and that of the deciduous forest. The accompanying map and diagram show this graphically.

Within biomes are smaller areas, or *developmental* stages. These finally end in the *climax* of the biome again, the stage beyond which there is no further change. For example, if the climax spruce woods of the coniferous biome are burned, they spring back into low brush, later into aspen and birch and finally develop into spruce woods again. The aspen and birch growth, although deciduous in nature, is not a part of the deciduous biome, but is really a developmental stage of the coniferous biome. The biome concept, then, takes into account the *succession*

of plants and includes both the developmental and final stages in its groupings.

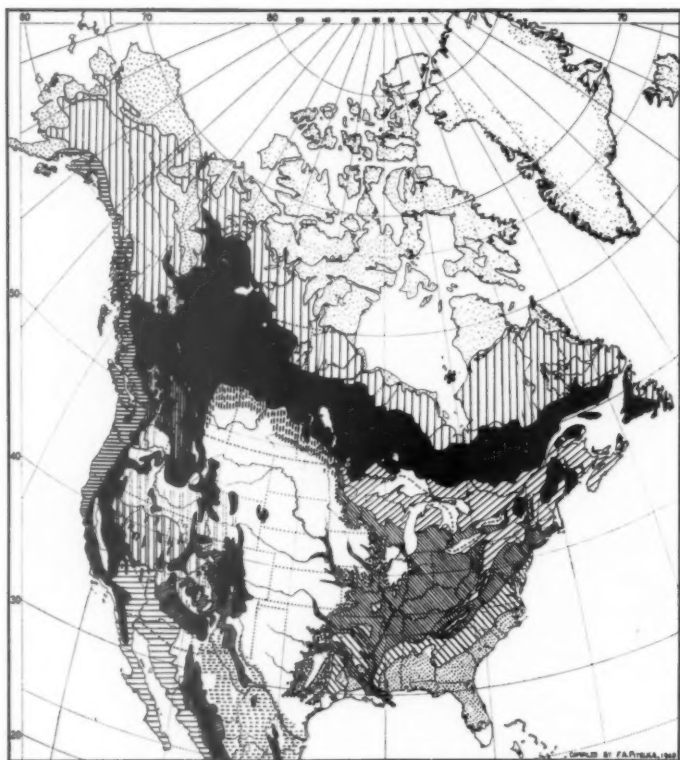
In comparing a map of the life zones of North America and one of the biomes, a major difference is quickly noticeable—life zones tend to stretch from *east to west*, across the continent, while the biomes, within the United States at least, tend to go *north and south*. (In Canada, however, they stretch across the continent.)

The biggest difference is in the great grasslands that extend from the Texas coast to the prairie provinces of Canada. This is *one* biome, the grassland biome. Merriam had split this into *three* life zones.

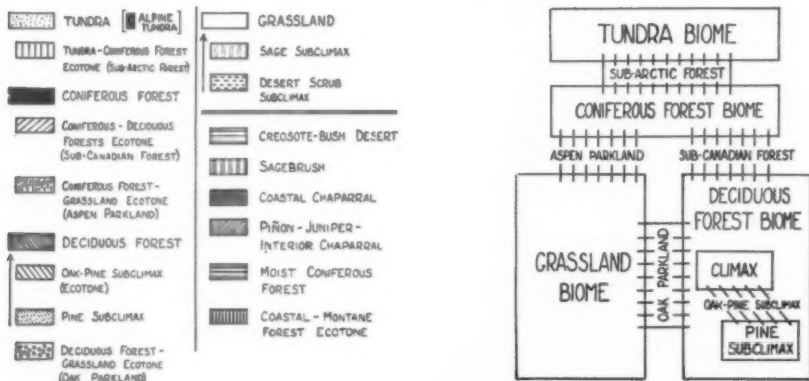
At first glance, it would seem that as far as the more northern parts of the continent are concerned, the biome theory is almost a direct substitution of terms for Merriam's life zones. For example, adherents to Merriam recognize three life zones in the Boreal parts of North America; the Arctic-Alpine, the Hudsonian, and the Canadian. In the biome theory, the tundra biome is substituted for the Arctic-Alpine zone; the sub-Arctic forest ecotone is substituted for the Hudsonian zone, and the coniferous forest biome is substituted for the Canadian zone. This is due, not to a similarity in concept, but to the fact, that in these areas life zones, which are based on temperature, coincidentally agree with the vegetation.

Do Birds Fit the Biome Idea?

As regards plant distribution, the biome concept seems to be an improvement over the life-zone idea, but can birds and other animals be made to conform to it, as the bio-ecologists are suggesting? It would appear to be the order of the day to try to fit the distribution of plants and animals into formulas. But nature is dynamic, full of variants



Map compiled by Frank A. Pitelka, courtesy American Midland Naturalist
THE BIOMES OF NORTH AMERICA and their ecotones and sub-climaxes. Diagram at lower right shows the relationship of North American biomes and their ecotones (zones of inter-gradation) east of the Rocky Mountains.



LIFE ZONES, BIOMES, OR LIFE FORMS?

which make it difficult to lay down simple rules by which all things can be neatly pigeon-holed. Each of the distributional concepts that has been advanced seems to have a certain amount of logic, and many birds can be made to fit it quite well, but I am sure that if a composite map were made outlining the contours of the distribution of all North American birds, the numerous lines limiting their ranges would suggest the merging of the colors of the spectrum. There would be a tendency for a large number of birds to cluster within the confines of the various proposed zones, but many species would not seem to conform at all; they would occupy more than one life zone, biome, biotic area, or environment, or only part of one. It is very doubtful whether any two North American birds occupy *exactly* the same range.

Recently I was asked by Dr. V. E. Shelford to prepare a paper on the birds of the coniferous forest with especial emphasis on their relation to ecological concepts. This was to be read at a symposium at the convention of the Wilson Ornithological Club. The more I probed into the problem of the biome *vs.* life-zone theory, the more bewildered I became, but one thing finally began to crystallize in my mind—that the biome seems scarcely more satisfactory than the life zone in describing bird distribution, and that most land birds appear to conform much more readily to the physical aspect of the vegetation, or '*life form*' as some authors have called it. We might simply refer to this preference by the old familiar term 'habitat' or 'habitat niche.'

Birds Do Fit 'Life Forms' or Habitat Niches

As Frank Pitelka* has pointed out,

*Pitelka, Frank A. 'Distribution of Birds in Relation to Major Biotic Communities.' *American Midland Naturalist*, Jan., 1941, pp. 113-137.

habitat niches that make up the developmental stages of a biome are frequently found in several biomes, and likewise the birds that occupy these niches also occur in similar situations in other biomes. To illustrate this, we might take the Redstart, which lives in the birch and aspen sub-climax of the coniferous forest (where the spruces have been burned or cut, and have grown back into these slender deciduous trees, which will later be replaced again by conifers). The Redstart also prefers second-growth trees in the deciduous forest biome. The important thing seems to be trees of a similar physical aspect—deciduous trees 20 or 30 or 40 years old.

The Parula Warbler is an especially good illustration of association with a particular life form. The northern race is a bird of the cool coniferous forest biome or Canadian life zone. Its niche is where the *Usnea* lichen, or bearded moss, hangs from the trees. The southern race of this bird is found in a totally different biome, the more humid parts of the warm Lower Austral Zone. There it is dependent on the Spanish moss, a plant not even remotely related to the *Usnea*. But the physical properties of the two plants, so far as the birds are concerned, are almost identical. That is what seems to be most important, not the temperature or the biome.

The Horned Lark is another illuminating example. Its various races are found all the way from the highlands of Colombia to the Arctic. It is found through at least five life zones, from the hot Texas coast to the cool Arctic tundra. It breeds in several different biomes; the important factor in its distribution is *broad expanses of short grass*. The extension of range of the Prairie Horned Lark into fields in the



Photo by Allan D. Cruickshank

THE PARULA WARBLER'S 'LIFE FORM' is Usnea in the North, Spanish moss in the South. Although the plants are unrelated, their physical properties are the same as far as the bird is concerned.

LIFE ZONES, BIOMES, OR LIFE FORMS?

deciduous biome shows that neither the biome nor the temperature is the fundamental limiting factor, for as soon as the settlers came in and cleared the land, the bird moved eastward. Recently, for the first time in ornithological history, it has even reached Long Island, where it nests along sandy barrier beaches on man-made 'prairies' that were created to keep shifting sands from covering the highways.

It is in climax, or late sub-climax, growths that birds seem to fit the biome concept best. It is also in climax growths where the life-zone concept seems to work best, especially in those areas (Arctic-Alpine, Hudsonian, Canadian, etc.) where temperature coincidentally agrees with vegetation. But it seems to me that even here it is the life form of the vegetation that is the more important factor. The fact is that in many biomes the climax (such as spruce and fir in the coniferous biome) *is not found outside that biome*, whereas the developmental stages (fields, low scrub, small deciduous trees, etc.) are often found in more than one biome.

Hog Island Gives Some Clues

An analysis of the bird life of one biome is revealing. I have done a lot of field birding in many parts of the coniferous forest biome, but the only spot where I have made anything approaching an ecological study of the breeding birds is half way down the coast of Maine between Bath and Rockland. In that area the true coniferous woodland has been crowded down to the sea, and is best represented on points of land jutting into the ocean, and on islands just off the mainland. There, six years ago, I started a breeding-bird census, which has since been carried on by Allan Cruickshank and Joseph Cadbury. The area is on Hog Island, where the Audubon Nature Camp is located, a peninsula thirty

acres in extent, covered largely by climax red and white spruce. Over a six-year period the breeding density has averaged a little better than five birds per acre, which is slightly higher than the average in most deciduous woodlands. The numbers have been surprisingly stable over these six years, running 75 pairs, 74, 85, 83, 78 and 81. The average is 79 breeding pairs and the deviation from this is less than 8%.

On the whole, numbers of individual species do not fluctuate widely either, but are not as stable as the combined population of all species. Here are some of the figures for the climax red and white spruce at the Audubon Nature Camp in Maine:

	No. of pairs
Flicker	1, 1, 1, 1, 1, 0
Crow	1, 2, 2, 2, 2, 2
Chickadee	1, 3, 3, 2, 2, 3
Olive-backed Thrush	4, 3, 4, 3, 3, 3
Hermit Thrush	0, 1, 1, 0, 1, 0

(Hermit Thrushes prefer woodlands where there is more deciduous growth mixed in.)

Junco	6, 7, 6, 7, 6, 7
Parula Warbler	10, 11, 10, 9, 9, 13

(This high density is because of the rich growth of *Usnea* fostered by fogs off the ocean.)

Magnolia Warbler	9, 8, 9, 8, 7, 7
Myrtle Warbler	7, 5, 7, 7, 6, 7
Black-throated Green Warbler	8, 9, 11, 10, 10, 10
Blackburnian Warbler	2, 4, 3, 3, 5, 5
Redstart	2, 3, 3, 3, 3, 2

(The Redstarts are present because of a small grove of birch and aspen where a patch of spruce had been cut off thirty years before.)

Three or four species showed a marked progressive change in numbers during the six years.

Cape May Warbler	4, 2, 1, 1, 1, 0
Bay-breasted Warbler	4, 3, 1, 0, 0, 0

(The disappearance of these last two birds is extremely interesting to me; both

were at the extreme southern limit of their known breeding ranges, and had not been found nesting quite as far south as that before. Both live in the climax spruce. The only thing that I can think of is that being at the very periphery of their range, they probably reflected the varying pressure of the breeding population farther north. This is not just a freak sample that applies only to our 30 acres. These two birds also disappeared from the rest of the neighborhood. Yet no environmental change is noticeable to us.)

Another bird that changed markedly was the Golden-crowned Kinglet which ran like this: 4, 4, 7, 8, 9, 10

(An increase of 250%. This possibly gives a clue to the tremendously heavy, almost irruptive flight of kinglets southward during the fall of 1941.)

Hog Island represents the spruce *climax*. I have no accurate figures of densities in different stages of forest development, but only a rough picture of the succession of bird and plant life as I have observed it on the adjacent mainland.

When the forest is completely cut off and replaced by fields, the most typical bird is the Savannah Sparrow, a bird common to grassy areas in many sections lying outside the spruce belt. If the fields are large, the Bobolink comes in. The Bobolink is an opportunist which has spread into other biotic regions with the extension of agriculture, even reaching parts of the Pacific States, where it was formerly unknown.

About the wet spots and brushy edges are found Yellow-throats and Song Sparrows, birds that occupy similar niches, or life forms, in many other biotic regions.

As the field or hillside grows into low brush the Towhee, Field Sparrow, Chestnut-sided Warbler and Nashville Warbler appear. At least the first two of these occupy similar habitat niches in other major biotic communities.

When the low shrubs are replaced by a birch and aspen sub-climax, the Ovenbird appears. This species is also a bird of the deciduous biome where similar situations occur, *i. e.* a closed crown and a leafy floor. The Redstart, Red-eyed Vireo and Ruffed Grouse are also attracted to this sub-climax, species which also fit similar niches in other biotic areas.

Where there is a mixture of small evergreens among the deciduous growth the White-throat, Hermit Thrush and Solitary Vireo come in. These species appear to be partial to such a mixed growth.

Later, when the smaller evergreens crowd out the birches and aspens, the Magnolia and Myrtle Warblers and Olive-backed Thrush come in. These are more truly typical of the coniferous forest biome. As the evergreens grow larger, the Black-throated Green and Blackburnian Warblers take their places and as the forest approaches a climax condition, the Golden-crowned Kinglet, Cape May Warbler, Bay-breasted Warbler and several woodpeckers become established. With the exception of the woodpeckers, these latter species are typical only of the coniferous biome. Their preferred life form is spruce and fir.

The several woodpeckers (Downy, Hairy, Flicker), however, are found numerous in climax tree growths of other biomes as well. They are not found in the climax of the coniferous biome because of dead or dying spruce and fir trees, but because of *any* dead or dying trees. Dead trees in the other biomes suit their needs just as well.

More Besides Habitat to Reckon with

I do not wish to give the impression that birds are controlled *entirely* by habitat preference. For example, on Long Island, New York, there exists much suitable, but unutilized,



Photo by S. A. Grimes

A WIDESPREAD NESTING DISTRIBUTION. *The Flicker's niche is where there is dead or dying wood, regardless of life zone or biome.*

breeding habitat for many species of birds. There must be some other limiting factor, therefore, either climatic, historic or geographic (such as the barrier of the Hudson River in the case of the Titmouse), or perhaps some sort of interspecific competition.

Many birds seem to conform to the outlines of the area occupied by their preferred vegetational life form, while others occupy only parts of it, and reach their northern or southern limits deep within it. This indicates that they are not entirely restricted in their distribution by dominant forms of vegetation. This, then, might leave room within the vegetational concept for the application of something like Merriam's temperature idea, or some other modification.

There are cases, too, where birds of the same species occupy totally different and seemingly unrelated environments in different parts of their range. The Olive-backed Thrush is a typical bird of the coniferous forest in Canada and the western mountains. On the other hand, one of its races breeds in deciduous woodlands and thickets throughout the lowlands of California.

Dr. Maurice Brooks tells me that in the mountains of West Virginia two or three species of warblers, usually characteristic of coniferous trees, depart from their usual custom and nest commonly in uniform deciduous growth. The conifer-loving Black-throated Green Warbler nests there in oaks and maples. It would be interesting to know how such a variation came about. However, departures of this sort are in the minority, except in very widely distributed species. Perhaps they are the throw-offs, the adaptable adventurers that eventually evolve into new and successful species. Here is a fascinating field open for conjecture and research.

Which?

What is it, then—life zones, biomes or life forms? I have been able to form only the following convictions:

1. The biome, although a logical concept as regards plants, is not much more satisfactory than the life zone in describing bird distribution, except in the climaxes.

2. Birds that occupy the developmental stages of a biome are often found in other biomes as well. This is because the vegetational forms that compose these stages can often be duplicated in other biomes.

3. Birds that occupy the climax growth of a biome are most frequently restricted to that biome and are an indicator of it. This is because the vegetational forms that make up the climax growth are often peculiar only to that one biome.

4. Birds appear to fit the life-zone concept best in climax growths in those areas (Arctic-Alpine, Hudsonian, Canadian, etc.) where temperature coincidentally agrees with the vegetation.

5. The physical aspect of the environment, which has also been called the niche, or life form, seems to be the most important factor influencing bird distribution, and this is further modified variously by climate, geographic barriers, competition with similar species of birds, population pressures, historic factors, and probably by many other less tangible influences.

These thoughts should not be called conclusions, as they all need further testing, lots of it. They closely parallel many of the ideas brought out in the illuminating article by Frank Pitelka, referred to earlier. The problem is still there in all its puzzling aspects. The Audubon breeding-bird censuses, now published for five years, will become a vital source of information in helping throw more light on these things.



American Gulls
Photographed by Allan D. Cruickshank







In the West, the identification of gulls, especially those in immature plumage, is even more difficult than in the East. Typical western species are shown on the two preceding pages. The Western Gull {upper left} with its dark back reminds one of the Black-backed in the East. Nesting in Mexico and wandering up the Pacific Coast, Heermann's Gull {lower left} is very dark and has a white head and red bill. The small, unmarked, greenish yellow bill distinguishes the little Short-billed Gull {center}. Commonest species along the West Coast is the California Gull {upper right}. The pink-footed Glaucous-winged Gull {lower right} is a large pale gull of the Pacific Coast with gray wing-tips.



Only breeding gull of the Southeast is the strictly coastal Laughing Gull {above}; it has a black head only during the summer. Bonaparte's Gull {immature, left} is one of the most widely distributed of our gulls, being found on both coasts and on large interior lakes; it has a great deal of white in the outer primaries.



The Herring Gull (above) is the abundant winter gull of the East Coast; the Ring-billed (below) ranges along both coasts and through the interior.



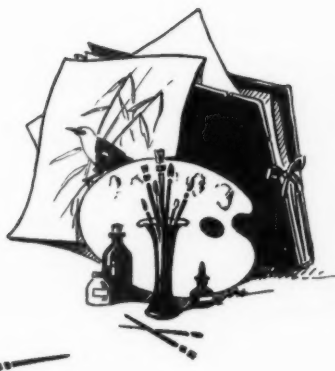
One of the handsomest of American gulls, the Great Black-backed (right), has been known to breed within the limits of the United States only in the last decade. Its nests are now being found more and more commonly along the coast from Massachusetts north.

The Kittiwake (below) is one of our most strictly oceanic gulls. For its nesting site, it chooses precipitous rocky cliffs from the Gulf of St. Lawrence to the Arctic; during the winter it wanders down the coast offshore to New Jersey. As a result of submarine warfare, oil-soaked birds will probably be seen more often along the Atlantic seaboard.



The Wildlife Gallery

By
GEORGE MIKSCH SUTTON



Louis Fuertes at Work

EARLY last spring, while purchasing equipment for an expedition to Mexico, I happened to stop in at a local shop where a certain sort of hiking shoe was sold. The shop was not among Ithaca's largest, nor was it on our principal business street; but the shoes were good. Examining a pair that seemed about right I chanced to remark that Louis Fuertes had had a pair that looked much like them.

"Louis Fuertes? Did you know Louis Fuertes?" The question popped out like a bird eager to be free of its cage.

"Why certainly I knew Louis Fuertes. He was my teacher. Years ago, when I was only a youngster, I spent part of the summer with the Fuertes family down at Sheldrake."

"Wonderful fellow, that Louie was. Wonderful fellow! He used to come in here right often. Say, did you ever hear the story of Louie Fuertes and the owl?"

Now whether I had heard the story of Fuertes and the owl or not I wanted to hear it again. So I hadn't heard it—of course.

"Well, some chap who'd shot a big Horned Owl brought it in to town.

Everybody stopped to look at it, you know the way they do, and by the time its wings had been spread a dozen times or so the man gets to thinking it was a tremendously big owl. So he phones Louie Fuertes about it and Louie says he'll come down and take a look.

"Well, Louie walks up to the man, and spreads the owl's wings as he naturally would, him being so much interested in birds, and says, 'Well, it's a big owl, all right. But it'd be bigger still if it was a female!'

"And the man, with the Owl, not knowing Louie from Adam, comes right back at him with this: 'Young man, this here's the *biggest* Horned Owl that ever was shot. And you don't have to take my word for it, neither, if you don't want to. Professor Louie Fuertes on the hill—I guess you must know who *he* is—says this here's the *biggest* Horned Owl on record, so, young feller, it's got to be the *biggest* one, see?'"

It has never been explained to me whether Fuertes identified himself on this occasion. Nor am I at all certain that the gargantuan owl found its way into the Fuertes collection. But I do know that wherever I go in Ithaca I hear stories about this beloved

AUDUBON MAGAZINE

'Louie'—stories of all sorts, most of them funny.

I never was 'in the field' with Fuertes. That is, we were never on a full-fledged expedition together. I never saw him skinning birds in his far-famed pan of corn meal. I never saw him mount a bird, or make paper eyes for one of his specimens. But I did see him draw and paint, and Fuertes thus at work was memorable.

He drew rapidly and with amazing accuracy. An eraser was always close by, and he used it frequently. He kept his pencil pointed by rubbing it down vigorously on a rectangle of fine sandpaper or a scrap of illustration board. His drawing-boards and paint boxes all seemed to be of an indifferent, not new-looking, sort. But the brushes were good. The big ones held water well and came to a point when given the proper running through the lips. Not one of them was tiny. The first lesson I learned through watching the great bird-painter at work was that a biggish brush with a good point was a far better tool than a small one that had to be dipped into paint repeatedly, 'pointed' often, and applied over and over in covering a given surface with the desired color.

The first pictures I watched Fuertes painting were, if I remember aright, illustrations for a book by John Dryden Kuser. One of these was of a Chipping Sparrow perched on a spray of rambler roses; another was of a Phoebe with an exquisitely patterned moth in its bill; and there were studies of a Towhee and a Bobolink. In all these the bird figure and important leaves and twigs were penciled in before any paint was put on. For this a hard pencil was used.

When the pencil work was done Fuertes gave the upper 'sky' part of the picture a special erasing with art-gum, then set the whole thing to one

side while he prepared the 'wash.' This wash, which was to be used as a general background color, was made from Payne's gray and certain blues and greens mixed with enough water to cover the bottom of the big white plate deeply.

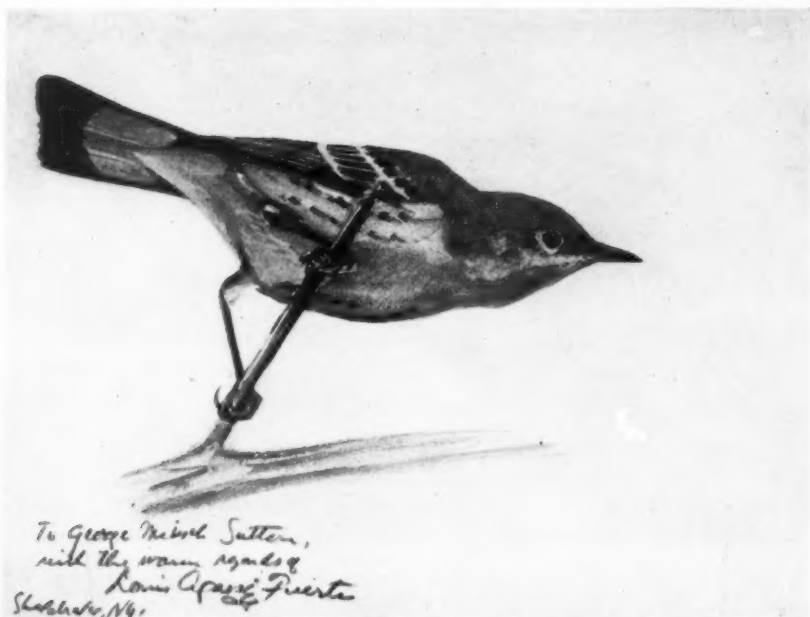
What Fuertes did next took my breath away. Lifting that precious drawing from its board and carrying it to the sink, he ran faucet water *all over it*. Holding it firmly by one corner, he let the water drain off, shook it gently, then flopped it onto the drawing board and thumb-tacked it down again. Blotting the outlined bird carefully with a clean wad of cloth he tilted the board so that, observing the reflections from the wetter and drier parts, he could tell when it was time to flow the wash on. Since the day was bright and warm we had not long to wait. All at once that biggest of the brushes was moving from left to right and back across the sheet—putting in background color. Certain places looked darker than others to me, but these did not worry Fuertes. His whole purpose obviously was to get to the bottom of the sheet as quickly as possible and to miss most of the bird if he could!

"Now it's time to look at the sandpipers," he announced gaily. "The picture'll look like heck while it's drying and I may be tempted to touch it up a bit. If there's one thing you mustn't do, when you paint a bird this way, it's monkey with the background wash while it's drying!"

So off we went to train the telescope on the flock of shore birds that fed on the Point. A pretty lot they were—several 'peeps,' a Spotty or two, and some Killdeer. I had been sketching them in pencil.

When we came back to the Chippy picture ten or fifteen minutes later, it was dry. Since it was not perfectly

THE WILDLIFE GALLERY



Drawing by Louis Agassiz Fuertes, courtesy George M. Sutton

ALIVE TO THE TIPS OF ITS TOES! *This rapid-fire sketch of a male Magnolia Warbler in fall plumage displays Fuertes' vigorous and authentic handling at its best.*

flat, Fuertes replaced the thumb-tacks. Now, using a thin piece of celluloid to protect the background color, he erased certain parts of the bird that had received a bit too much paint.

Next he gave color and depth to the accessory material. This he did not from memory but from actual leaves and twigs pulled from plants that grew near the house. It was interesting to watch him painting leaves, for he used so little green. Through observing him and his models I learned that most of a leaf's color may be blue or blue-gray reflected from the sky!

When, at length, the bird itself was to receive Fuertes' attention, some thick dark gray paint was mixed, the brush was finely tipped, and the shadowed parts of the bill went in. How thrilling it was to see a tiny dark spot suddenly become a nostril, a

hair-thin line the commissure! With a wetter brush, light tones were put in. If a certain high-light was not distinct enough, Fuertes unceremoniously sucked the brush dry and worked the paint from the paper with the sharp tip.

The painting of the bird itself was full of surprises. Using that same dark paint he had used for the bill he made fine lines about the eyes, along the edges of the wings, and here and there where the back-streaking was definite. Sucking the brush dry, he flattened its tip by squeezing it between thumb and finger. Then, dipping it lightly in paint, he made crisscross feathery strokes on the side of the head precisely where the finished auriculars would be.

Every important wing feather was carefully painted with a dilution of this



Courtesy George M. Sutton

FUERTES IN HIS STUDIO. *The famous ornithologist-artist had a fine collection of bird skins. Many of these he prepared himself with an eye to their serving as models.*

same indefinite color—the middle coverts, the greater coverts, the primaries and secondaries. Great care was used to keep these feathers crisply distinct. The bird now had a curiously piebald appearance. It was perfectly flat, wholly without color, and looked not unlike a photographic negative. This was the hard, solid foundation on which Fuertes would build one of those marvelously soft, feather-covered birds of his!

When the colors themselves began to go on I instantly perceived how important those dark little lines were. It was they, *showing through the colors*, that gave the feather effect. The colors were put on in broad, bold strokes that covered whole feather tracts at once. If too much color got on, pop into Fuertes' mouth went the brush, and the unwanted paint was stroked off.

"Sure, I eat lots of paint," Fuertes admitted, "but it never seems to hurt me!"

The feet and the eye came last. Anyone who has painted birds is aware of the peculiar thrill attending that moment when, with the rest of the work done, one may paint in that deepest of darks; leave untouched that sharpest of high-lights; and thus, with a few deft strokes, bring one's bird to life. Several times I watched Fuertes do it. Once the eye was in, the bird took on three-dimensional quality, individualism and vitality—as if by magic.

Not all of Fuertes' bird paintings were made in the manner above described. Many of his quick sketches (like that shown in our illustration) were made on white paper without background of any sort.

Fuertes applied himself intently, almost fiercely, when he worked. But he did not mind being watched and he often chatted vivaciously while painting. This has always been a mystery to me—but the ways of genius are full of mystery!

What Killed Cock Robin?

By C. Brooke Worth

WHO killed Cock Robin?

"I," said the sparrow, "with my bow and arrow."

Who saw him die?

"I" said the fly, "with my little eye."

The nursery rhyme is a mixture of probable fact and impossible fiction. The English Sparrow might intentionally have killed a *young* Robin; the innocent fly might inadvertently have killed an *adult* Robin. It is known that certain species of a special kind of fly—a hippoboscid fly—carries a malaria-like blood disease from pigeon to pigeon. Perhaps the fly in the poem was one of the Hippoboscidae, specializing in Robin-malaria.

People often ask if wild creatures ever get sick, and if so, what sorts of diseases they get. They are usually astounded to learn that malaria, in one of its common forms, is transmitted to birds by mosquitoes. Imagine a mosquito daring to bite a flycatcher! But even insect-eating birds have to rest at night, and they are then as vulnerable to blood-sucking pests as human beings.

Malaria often assumes a more or less harmless, chronic form in birds, and in such cases there is no external evidence that the disease exists. A canary, for example, will continue singing as cheerfully as ever, and it is only when it dies from some other cause that post-mortem examination shows the greatly enlarged spleen which accompanies prolonged infection with the malaria parasite.

Malaria has been discovered in most

of our common birds—from English Sparrows to Red-wings, and on through owls and ducks to many other species. Even snakes and frogs have their own private brands of mosquito-borne malaria!

Another disease carried from bird to bird by mosquitoes is filariasis, which is especially common in Crows, although I have also seen it in Song Sparrows, White-throated Sparrows, Sharp-tailed Sparrows, Slate-colored Juncos, Blue Jays, and House Wrens. It is caused by a small worm, known as a *Filaria*, which lives in the body cavity of the bird and produces a great number of tiny young worms called *Microfilariae*. These enter the blood stream of the bird and circulate through the arteries, capillaries, and veins until they are taken up by a feeding mosquito. At its next meal, the mosquito injects the *Microfilariae* into another bird, and the little worms then mature into big ones and begin the cycle anew.

Human beings in the Tropics also suffer from filariasis, the advanced stages of the disease being accompanied by great swelling of the legs caused by the *Microfilariae* blocking the lymphatic circulation. In this phase, the disease in humans is called elephantiasis. In birds, however, the *Microfilariae* seem to cause little direct damage, the cases in my hands having died from some other cause.

Many other kinds of worms infest birds. The full number is not yet known, but studies now in progress are telling us more and more about this interesting



Photo by Allan D. Cruickshank

MALARIA HAS BEEN DISCOVERED IN MANY BIRDS. Even insect-eating species, like the Pooe, are vulnerable to mosquitoes, through which the disease is transmitted.

WHAT KILLED COCK ROBIN?

matter. Hawks are particularly likely to harbor a relative of the common *Ascaris* round-worm of horses and humans. I have seen many Starlings and Juncos with intestinal tape-worms, some quite small, but others as large proportionately as if a man were infested with garter snakes!

Representatives of a particularly interesting group of worms, called flukes, are common in fish-eating birds. These creatures have excruciatingly difficult scientific names but are, on the whole, insignificant in appearance and harmless in their activities in the bird. As a class, they have very complex life histories, spending their early days first in snails, then in fish, and eventually coming to maturity in such birds as herons and gulls.

A final class of worm-like parasites in birds are the *Acanthocephala*, which are so specialized in their dependence on a bird environment that they have given up almost all activities but egg production. They have a beak, or proboscis, armed with hooks which they sink into their host's intestinal wall, and once safely anchored there, they scarcely bother to wriggle or to go through any other conventional form of worm-setting-up-exercises.

It would be erroneous to surmise that birds are unusually subject to worm diseases. Judged by human standards, perhaps they are. But according to the yardstick of nature, birds have no more than their natural share of such inward inhabitants. Zoölogists have come to the conclusion that the number of free-living or independent animals is far less than the number which depend on other forms for sustenance. Human freedom from worms is not a natural happening, but rather a consequence of civilization and hygiene.

Worms constitute only a fraction of the invaders that pester birds. Aside

from Protozoa, bacteria, fungi, and viruses, there are various external parasites other than mosquitoes. Among such blood-suckers are ticks, mites, and hippoboscids flies. Mites frequently infest birds' nests so heavily that the parents desert their young.

There is a peculiar group of external parasites called Mallophaga. Technically this means 'the feather-eaters,' and that is exactly what they do. They are not known ever to suck blood, their entire sustenance being drawn from the materials of which feathers are composed. These insects vary in size from larger ones a quarter of an inch long, living on ducks and gulls, to the tiny ones barely visible to the unaided eye, which spend their lives only in the subdivisions of the flight feathers of many common land birds. The best way to find these small ones is to spread the bird's wing and hold it up to the light. The Mallophaga will then be seen as specks of dust in the vane of the feather; usually they are arranged in groups, as many as fifty or more individuals occupying a small area near the midportion of the feather. As a general rule, if only certain feathers of one wing are tenanted, only the corresponding feathers of the other wing will be found parasitized, and even the number of lice per feather will likewise show a close parallel.

Mallophaga seem to do the birds no harm, although they may be present in large numbers—thousands, in fact. Since they do not suck blood, they are not known to transmit any bird diseases. Their sharply curved legs and flattened bodies enable them to scuttle quickly through their feathery habitat, and it is often hard to catch them.

They usually lay only a single egg at a time—an oval body, almost as large as the abdomen of the female. It is glued to the base of a feather. In the case of a White-throated Sparrow that

I trapped in the spring of 1940, the feathers of the chin and throat were thickly seeded with whitish eggs. The bird was apparently unable to scratch them off with its feet, and it certainly could not get at them with its beak. An attempt to raise Mallophaga from these eggs failed. I put some in a test tube with a few feathers and a moistened piece of blotting paper to provide the proper moisture, and incubated them at body temperature, but when the young hatched, they refused to eat; they all soon died.

Curiously enough the Mallophaga, which represent an exceedingly specialized branch of the insect world, are found only on birds and on Australian marsupials—Kangaroos, Wallabies, etc. This may point to an exceedingly ancient lineage for these ectoparasites. It may even suggest that they developed their exclusive tastes originally on mammals, only secondarily transferring their activities to birds as a result of the extinction, in most parts of the globe, of the early wealth of marsupials.

All these so-called 'diseases' of birds seem to be relatively benign, though a human being might quickly go to his doctor if he suspected himself of affording a home to any such companions, within or without his person. There are, however, many serious and usually fatal diseases among our common wild birds.

Malaria has already been discussed as a disease caused by a unicellular animal, belonging to the Protozoa. In this same class or division of the animal kingdom there is a group of intestinal dwellers called the Coccidia. Fortunately these are quite averse to humans, cases in man being extremely rare. Their favorite position in birds is in the caeca, which correspond roughly to a pair of appendices near the end of the large intestine. Domestic turkeys often die in large numbers

from a disease called blackhead, which is merely 'double appendicitis' caused by Coccidia.

Not long ago a friend brought me a sick Oven-bird which he had found, unable to fly, in the woods. It had a swollen abdomen and was very weak. As was only to be expected, it died very shortly. Post-mortem examination disclosed that it had suffered another form of coccidiosis, in this case harboring the parasites in its liver. The animals were so numerous that they had caused the organ to swell to six times its normal size. Microscopic study showed that most of the actual tissue of the liver had been destroyed, the remainder being essentially a sac, crammed full of Coccidia.

Various other Protozoa live in birds, among them the Flagellates in the mouth cavity of most species and the intestinal amoebae, quite similar to human varieties.

Among fungi, a number of kinds of mold are known to infest birds. The closest parallel to human disease in this case is found in the lowly 'athlete's foot.' But in birds the mold does its damage to the respiratory tract. The course of the disease is slow, but it gradually progresses until it may invade a large area of the internal surface of the trachea, bronchi, lungs, and accessory air spaces, which ramify through the bird's body while retaining direct connections with the lungs.

At the Philadelphia Zoo I once saw a Cassowary that had died of 'mold disease.' The inside of its trachea was so overgrown with the microscopic mycelia or strands of the fungus that it looked as if it were fur-lined. The growth was whitish in color, so that the fur might have been ermine!

A dead Song Sparrow that was sent to me was so extensively invaded by mold in the thoracic region that all the organs were bound solidly to each



Photo by Allan D. Cruickshank
BACTERIAL DISEASES IN BIRDS NEED MORE STUDY. *A condition similar, if not identical, to paratyphoid may reach epidemic proportions among crowded gatherings of birds, like this blackbird flock.*

other and to the bony framework of the chest wall. During its last moments it could scarcely have breathed, and even the heart must have been hard put to contract.

In my experience, infection by molds is uncommon in wild birds. In zoos, where birds may live longer than they would in the wild, mold disease is more commonly seen. This parallels the fact that as the average span of human life is being prolonged, degenerative diseases such as cancer and arteriosclerosis are becoming more prevalent in the population, *i.e.*, more people live to an age when these diseases naturally occur than formerly.

As for bacterial diseases, comparatively little is known of these among birds. A condition called paratyphoid, which may reach epidemic proportions among crowded birds, has been observed occasionally in captive groups. A condition that I suspect to be similar, if not identical, appears when birds congregate in the fall for the southward migration. At this time many of the birds found dead near lighthouses, bridges, etc., show inflammation of the intestines and congestion of the lungs which are probably of bacterial nature, and possibly a form of paratyphoid infection. This subject has not, to my knowledge, received adequate study.

Ordinary bacterial infections do not seem to be as serious among birds as humans. Natural resistance enables birds to overcome many injuries which, uncared for, would be fatal to the average man. I once found a young Black-crowned Night Heron that had fallen out of its nest and sustained a compound fracture of the left humerus. About an inch of naked bone protruded from the wound; but the subsequent healing process was miraculous. Natural decomposition removed the exposed fragment of bone. When this encumbrance dropped off, the skin

closed over the opening with scarcely a scar. The internal ends of the bone then united in perfect alignment, and the bird was eventually able to fly, although one wing was somewhat shorter than the other.

This case was probably exceptional, for I have seen deformities following fractures in a number of species of sparrows. But freedom from bone infection seems not to be remarkable in birds.

A fatal case of peritonitis in a Black-crowned Night Heron was less the immediate result of bacterial infection than of repeated assaults on the abdominal cavity by Nematode worms. In this instance the intestinal parasites were so numerous that they kept boring through the walls of their tubular abode, each new hole allowing a fresh influx of contamination into the normally sterile peritoneal space. The infection must have been overcome countless times, judging by the mass of adhesions which had formed. When the bird finally arrived at my autopsy table, it was dead, not of peritonitis primarily, but of intestinal obstruction by the worms themselves.

Birds are subject to tuberculosis, just as people are, but the kind of germ causing the avian disease is sufficiently different to be harmless to humans. So far as I know the human bacillus is also non-injurious to birds. The chief difference between the two kinds of tuberculosis is that the disease may run a much more rapid course in birds.

Almost everyone has heard of psittacosis or 'parrot fever.' This is one of the very few bird diseases which is directly transmissible to man. If your parrot has psittacosis, you are running the risk, as long as you keep it, of contracting a chronic form of pneumonia which may have serious results. Nowadays parrots must be quarantined before being imported from the Tropics,

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so that most of these pets in stores are healthy.

'Duck sickness' has received wide attention in the last few years, due to the decrease in numbers of these game birds. Anything adding materially to their mortality must of necessity arouse many classes of bird students, particularly fair-minded sportsmen. This disease was first noted in the West, where during the hot months many ducks died for some unexplained reason. These birds were feeding in pools of water on the so-called alkali flats, and it was believed at first that they were consuming too much alkaline salt. This theory was strengthened by the finding that many dying birds could be revived by placing them in fresh water.

More recently, however, it has been proved that the ducks have been poisoned by a bacterial toxin, very similar to the one causing ptomaine poisoning in humans. The condition is known technically as botulism or food poisoning. In the case of the ducks, it was found that hot weather partially dried up the small ponds, thereby killing animal and plant life upon which the birds depended. In a few days certain bacteria, thriving on the dead carcasses and vegetation, produced enough toxin as a by-product of their life processes to afford a serious menace to anything which thereafter partook of the tainted food.

Modern measures are rapidly relieving this situation. Not only are workers still gathering up sick ducks and transferring them to fresh waters, but, more important, streams are being diverted until they constantly flood areas which used to run partially dry in summer. Thus, the era of indiscriminate marsh drainage begins to dwindle, as more enlightened methods of wildlife management come into play.

A less common but more baffling disease of ducks is lead poisoning.

This is found on winter feeding-grounds of ducks in areas where hunters have been particularly active during the fall. In feeding, ducks always swallow a certain amount of gravel, apparently intentionally, to assist in the grinding processes of digestion. Where many shots have been fired over the water, the bottom of the river or bay is often sufficiently covered with lead pellets to enable a single duck to eat a dangerous number of them. Apparently the shot is of just the size and shape to appeal to the average duck. By springtime the birds may have assimilated enough of the metal to cause all the damaging and fatal effects of lead poisoning.

So far there has been no satisfactory remedy for this situation in dangerous localities. But the counter-measure of making near-by sanctuaries more attractive has lured many birds unwittingly out of the zone of peril.

Small mention has been made of many other bird diseases. Malformations are occasionally seen, although monstrous embryos usually fail to hatch. There are degenerative changes in birds that live long enough to acquire such afflictions. Viruses, endocrine imbalances, mechanical accidents, all these ally the pathology of birds to textbook treatises of human medicine.

If you have ever seen such a book, however, you will remember that it weighs as much as several years' issues of this magazine! Wherefore it is time to return to Cock Robin with a few brief verses of adapted poetry.

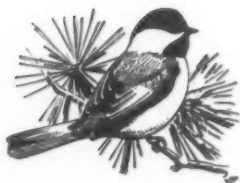
"Who caught his blood?"

"I," said the malaria mosquito,
"with my little proboscis."

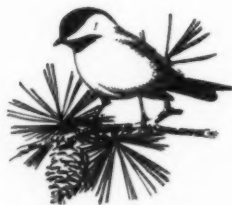
"Who'll dig his grave?"

"I," said the tapeworm, "for my eggs must get quickly into the soil."

And all the animals, with rejoicing and thanksgiving, used up poor Cock Robin's body until nothing remained but a useless and forgotten skeleton.



The Director Reports to You



WELL, it's a world war, in every sense of the word, and we know we'll win, and that it's our business to make a better world after the last shot is fired. And we all understand that, whatever it costs this country, we've got to pay the bill. But the individual citizen and the individual business, or institution, must face the problems of financing. At moments, we all wonder how it's going to be done. Loyally we buy defense bonds; hopefully we suppose we'll find the money somewhere to meet the upbounding taxation. We watch the price of living and the cost of business operation rise. We see industries closing or turning into something else, and wonder how soon our own business will somehow be affected, perhaps curtailed, by decreased purchasing capacity. The readjustments that lie ahead of us can hardly be foreseen, but their magnitude is felt in the skies above us all, like the pull of an approaching astronomical body.

The National Audubon Society began, the day that Hitler invaded Poland, to look ahead and try to see how it could adjust itself, both in its aims and in practical details, to the inevitable involvement of the United States in the world conflict. As the conflict has come closer, our plans have speeded up.

Those plans do not contemplate closing the sanctuaries, turning our patrol fleet over to the Coast Guard, suppressing this magazine, or converting Audubon House into a hospital. There is a great bustle going on in some phases of civilian defense activities which ac-

complishes, as its best result, little more than contributing feelings of satisfaction to hitherto more or less quiescent members of human society, in the conviction that they are helping to defend the country. It is obviously a gesture of ostentation on the part of the man who plows up his lawn to plant rutabaga for Uncle Sam, as long as there is agricultural land still not utilized. This Society, which would turn over to the government all its equipment and services when, as, and if they might be found indispensable for defense, intends to take no action that is merely for purposes of making a "showing." As trustees of the donations of our supporters, we assume that their attitude must be the same. We assume that one of the things for which you hope to win the war is to find that public institutions like our churches, schools, hospitals, libraries, the Red Cross, and the National Audubon Society and its works, are still standing, intact, and in vigorous function.

Our Lines All Holding

SO OUR problem as we see it here at Audubon House is to keep the activities of the National Audubon Society running. If necessary, we will run them on a budget reduced far below what we would like to see as a minimum for the sake of the birds. Our newly formed Fact-Finding Committee is hunting everywhere for places to reduce expenses. For those expenses are your expenses. We want your dollar given to the Audubon Society to stretch



Photo by Leo Pavelle

WE DO NOT CONTEMPLATE CLOSING OUR SANCTUARIES. *We assume that when this war is over, you will wish to find the Rainey and all others still functioning.*

to the absolute limit. But we want to hold the line. If we gave up the sanctuary maintenance now, we might retain legal rights in the land, but, biologically speaking, we might lose them forever. There is no use in keeping a cage out of which the bird has flown, or in holding hollow title to a sanctuary which there are no birds to occupy. And the birds of our sanctuaries have enemies, ever on the watch for the slightest relaxation of our patrol.

If we gave up the junior educational program we would lose another sort of bird. It has taken us over thirty years to build up the far-flung junior club membership to its present effectiveness. So it goes, on one score after another. A couple of years of neglect would be sufficient to undo the work of a generation here.

We Can Do It If You Help

THE Audubon Society weathered the First World War, when there were

more forms of hysteria rife than there are this time. It weathered the depression. It has weathered the assaults of many enemies and detractors. It will weather the crisis ahead.

We believe that those who have made our existence possible in the past will do their utmost to sustain us still. We believe that the birds of America should not be asked to bear any part of the sacrifices we are all willing to make. We mean, in war as in peace, to stand by the birds, and ask you confidently to stand by us. Like every other phase of the American way, now under crucial strain, the Audubon cause requires increased support. If you think as we do, tell us, by word and deed. You hear from us in these pages regularly. May we hope to hear from you?

Waterfowl Refuges Promised Support

THE National Audubon Society's work is just part, of course, of a much larger national effort on behalf of the con-



Photo by Allan D. Cruickshank

INVADED THE EAST. *Observers noted a flight of Snowy Owls, although tabulations for the Christmas Bird Count were made difficult due to necessary military restrictions.*

THE DIRECTOR REPORTS TO YOU

servation of all wildlife resources. That conservation is jealously guarded by many other private institutions, as well as by the Federal government and by some of the most enlightened States. What the attitude toward wildlife conservation is, in the national capital, we sounded out by writing to the President. We asked whether the Federal government would continue to maintain the migratory waterfowl refuges administered by the Fish and Wildlife Service (formerly Biological Survey) now under the Department of Interior. At the direction of President Roosevelt, Secretary Harold Ickes of Interior replied:

I think you may be assured that the national wildlife conservation program carried on so successfully by this Department will not be abandoned. On the contrary I hope we shall be able to continue it as a major effort. It cannot be foreseen to what extent the needs of defense will require the reduction of other worthy programs, but I may say that I consider our wildlife to be one of the great national resources that are vitally important to our defense system and that it should be fostered in war as well as in peace.

Wildlife Refuges from Washington

WE'VE all heard that the District of Columbia is "too small for a State, too large for a madhouse." There can't be a question that decentralization of many bureaus, that now crowd the capital's office and housing space far beyond the capacity of efficiency and safety, must take place. But it's startling to the friends of wildlife conservation to learn that the Fish and Wildlife Service may be removed by official action to Chicago. The work of the Fish and Wildlife Service, the most powerful conservation organization in the country, is necessarily conducted by trained experts, 'career men' who have built their lives around this organization. To remove them from Washington where they have purchased homes is a serious hardship for the personnel. But it will be still more serious from the point of view of

practical and scientific effectiveness if the Service is removed from the center of the web of Federal and interstate relations, and from the laboratories, libraries, and experimental grounds in and about Washington, to a city which is geared to commercial efficiency rather than scientific. The Chicago hegira would mean that the Wildlife Service would get very much out of touch with the administration of sister conservation agencies, such as the Soil Conservation and Forest Services.

The solution is a simple one, according to the National Wildlife Federation, whose honorary president and founder is our old friend 'Ding' Darling. At Patuxent, Maryland, within ten miles of the capital, the Wildlife Service is proprietor of 3000 acres now being used as a wildlife refuge, with laboratories for experimental work. Temporary buildings could be erected here to house the Service at less cost, it is claimed, than it would cost to rent or buy space in the city of Chicago. If you want to help keep the Wildlife Service within the magnetic field of Washington and not outside its horizon, you can do it for three cents. Just write your views to Harold Smith, Director of the Budget, Washington, D. C. It's remarkable how much good it does to lift even one voice, and how little good ever came of letting things slide in silence.

Bird Watchers Could Spot Invaders

ORNITHOLOGISTS are used to being taken for 'naturals,' chased by dogs, suspiciously watched by farmers, treed by bulls, mistaken for German tourists. But this past Christmas season it was something new, though, when Audubonians were taking the Christmas Bird Count, to be set down as enemy aliens with suspicious binoculars, and exhibiting highly questionable activities in places where honest citizens have no call to go.

Members of the Hoffmann Bird Club in the Berkshires, for instance, on one of the coldest days of the year, were accosted by the chief of police of Great Barrington, who had dashed in pursuit of them when their movements jangled the nerves of the natives. "What's going on here?" demanded the law. "Hundred and fifty Goldfinches," replied Dan Gleize. "Did you ever see so many in one flock?" Bartlett Hendricks, curator of the science department of the Berkshire Museum, considering his telescope and tripod a dead ringer for a trench mortar, folded his kit like the Ay-rabs and as silently stole away.

This was but one incident out of many where patriots rang up the local police to report that our bird counters were parachute troops, or enemy engineers about to select sites for landing fields or gun emplacements. In particular, along the beaches and salt marshes we have found ourselves in equivocal positions. And it must be admitted that under war conditions there are certain strategic localities where all sorts of peaceful activities, including the gentle art of fishing as well as the harmless science of bird watching, may have to be restricted. But it occurs to us that it might be possible for ornithologists to keep their ancient riparian rights by engaging, as some of the fishermen have, to do their share in watching for planes, submarines, and other enemy craft. Local ornithologists of long residence often know the lay of the coast as well as the fishermen, and, as observers of all that moves on the water or in the air, they are probably the best trained civilians you could find.

You Can't Take It With You

WILDLIFE photographers—'ten-SHUN! Have you ever thought what you are going to do with your negatives, and motion-picture films? Naturally, you treasure them; you keep

them carefully stored, and filed, and often indexed. They are your own private art gallery, and you are very careful what use is made of them.

But you can't take them with you. And when you are no longer here to dispose of them, they will be disposed of, nevertheless. Sold for extremely little; or even thrown away. Either that, or they will gather dust till kingdom come. Why not make, right now, a definite arrangement, just as you would for any other valuable property, for putting these precious records of a lifetime into the widest and most understanding circulation? In short, why not will them to the National Audubon Society? Can you think of any institution where they would be better appreciated, better cared for, or used more often? To perpetuity, your negatives and films would be accredited to your name.

Indeed, we would be willing to agree with you to share with your heirs the proceeds of the sales of prints for a specified period. In short, we would be managing an investment for your family, one upon which they would have poor facilities for realizing. You know that if your collection simply falls into your estate, to be disposed of at anything it will bring, it will hardly get into hands where its value will be appreciated or capitalized on as you would hope. But the National Audubon Society, perhaps more than any other institution, is able to appreciate your wildlife negatives and films at their real value and use them to best advantage in promoting nature education.

Why Shoot Your Friends?

FOR years the National Audubon Society, along with all the ornithologists in the country, has been insisting that the value of hawks and other predatory birds far exceeds any damage they do. We have always protested against



Photo by Allan D. Cruickshank

THE GOVERNMENT'S WILDLIFE CONSERVATION PROGRAM WILL NOT BE ABANDONED. Wrote Secretary Ickes, "Our wildlife . . . is vitally important . . . it should be fostered in war as well as in peace."



Photo by Allan D. Crutchshank

VITAL FOR THE FUTURE is the appreciation, understanding and conservation of American nature, and to the teaching of this end the Audubon Nature Camp is devoted.

their classification as 'vermin.' When the farmer shoots the hawks he might just as reasonably shoot the farm cat. The rejoicing in the ranks of rats and mice and other rodents is equally great.

Never was this more clearly exemplified than down on the Rio Grande in recent months—in 'The Valley,' as Texans call it. The big tomato crop of the Valley has been simply over-run by rats and mice. Everybody along the Rio Grande knew that—to his sorrow; but it took our Warden Larson to realize that the scarcity of hawks was the most likely explanation. Even the management of State experimental stations, when he talked with them, had not connected the scarcity of hawks with the plague of rodents. So now John Larson is going on the local radio stations down there with a plea that Valley farmers shall not shoot their best friends when they come winging over.

The Battle of the Flies

IT'S still on—the arguments between the bird protectionists and the fly-tyers who insist on having wild-bird plumage for their lures, even though many of them admit that you can catch as many and as big fish with substitutes. We regret that we cannot announce yet a resolving of the issue. But we can announce that our supporters include the New York State Federation of Garden Clubs, the Garden Club of America, the American Humane Association, and millinery industry. Against us still we have our friends—for of course they are still that, however we disagree with them—the Izaak Walton League. The professional fly-tyers in New York State, it seems likely, will go to the legislature to try to get the present law, for the principles of which we have fought from the beginning of this Society almost half a century ago, amended. And that amendment, peeled

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of all legal verbiage, would simply mean that a breach would be made in the present legislation which would permit commercial exploitation of wild-bird plumage. We hope it won't come to that, but if there's a showdown we expect to win the battle for the birds. If we lose the first round, we'll win later on.

One Million Contacts a Year

THE work of Audubon House goes on through the years, staffed by the most devoted experts we can find, and we think, sometimes, that we have a pretty clear picture of what their work, and your support, mean to the birds. It is harder to tell what they mean to the human friends of the birds. But, just to take a sounding, we sent out a return postal card to all Audubon campers to find out how many adults and children they had contacted this last year on the score of nature conservation and appreciation, through school classes, clubs, camps, libraries, lectures, field-trips and exhibits.

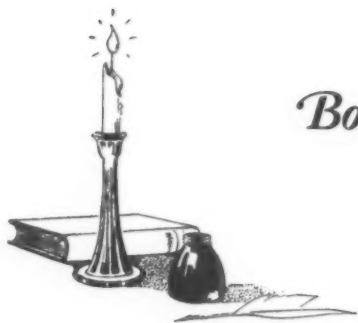
The returns were a surprise even to this habitually hopeful office. Although only 314 camp alumni out of 1210 replied, still those three-hundred-odd had spread the good word to more than 250,000 others. That means that each one of the Audubon campers in the last year has reached, by one method or another, 312 others. Good going, everybody!

But grow old along with us, the best is yet, etc. For in the past year Audubon House has reached through its publications 67,000 adults and 541,000 children. In most cases these were not merely single contacts. The figures represent repeated approaches, in some cases among school children, daily ones over the course of the school year. In various clubs and camps the contact was more or less continuous, over a course of time. Often enough and long

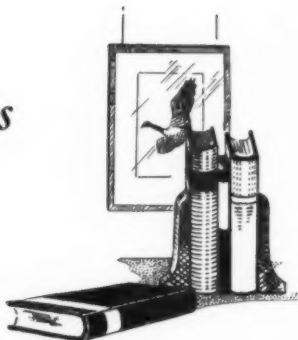
enough, to make a sure thing of instilling the principles you stand for. The grand total is 854,367 persons with whom we came in touch last year.

Add to all this the contact made by the Audubon camp alumni who did not reply to our questionnaire, and you can see for yourself that our influence must have touched one million Americans of all ages, in all parts of the country in the past twelve months. Does that satisfy you that the Audubon camp and the junior clubs do their job? That your support of the National Audubon Society pays its way, many times over, as it goes? We believe that no other agency in the country having even approximately our ideals and cutting out for itself a similar job, can equal the figures that we can show.

True, all this is quantitative in its measure. On the qualitative score statistics are useless. We don't say that for our part we're content—no one should ever be satisfied with the *quality* of his accomplishments. But we are confident that of all the offerings that our complex modern civilization brings to the million citizens reached by the Audubon gospel last year, the appreciation, understanding, and conservation of American nature is second to nothing. There is no faintest taint of self-interest in the principles behind the Audubon movement. Its values, being intangible, are beyond price. No one knows better than the readers of these words that they are, every day in the year, both timely and timeless. A philosophy based upon nature is both the most realistic and yet the most solacing. To practice conservation of nature is to train one's self in citizenship. To understand and enjoy it is to sharpen the intelligence of youth and lay by treasure for old age. If, through you, we help a million friends a year to these fruits, you and the rest of us Audubonians may well feel satisfaction.



Book Reviews



THE HANDBOOK OF BRITISH BIRDS. By H. F. WITHERBY, F. C. R. JOURDAIN, N. F. TICEHURST and B. W. TUCKER. Five volumes. 8 vo. Illustrated with 133 color and 24 monochrome plates figuring all species, 300 text figures, and 37 maps. H. F. and G. Witherby, Ltd., London, 1938-41. 5 £ 5s.

Reviewed by
ROBERT CUSHMAN MURPHY
Curator of Oceanic Birds, American Museum of Natural History

Earlier reviewers have expressed the somewhat dubious 'hope' that this work, of which publication was begun shortly before the start of the present fateful period in world history, might survive to completion. In the meantime, the war has absorbed more and more of the mental and material resources of the entire British public; one of the authors of the book has died; one of the painters of the abundant colored illustrations has been in active duty on a destroyer since the commencement of hostilities. Yet, despite all exigencies, the fifth and final volume of 'The Handbook of British Birds' has now been issued and distributed the world over. It is not necessary to enlarge further anent the triumph of organization, the persistence of character, the control of the routes of supply and transportation, which have enabled authors and publishers to place the whole of this exemplary monograph on

our desks within three years from the date of issue of the first part.

It is a commonplace to say that ornithological literature is of an extremely scattered character. Publication proceeds at a rapid and increasing rate, and a vast amount of useful and interesting information can be found only by means of painstaking bibliographical search through scores or even hundreds of books and articles in several languages.

The state of affairs thus described has, of course, been true for a long while. Handbooks, keys, regional studies, skillfully compiled life histories relating either to particular areas or to particular groups of birds, have been the natural attempt to reduce an enormous amount of information to readily usable scope. Since the appearance of Dr. Frank M. Chapman's 'Handbook of Birds of Eastern North America,' there has been no dearth of convenient works of reference on the avifauna of our own country. Yet it is equally true that we have absolutely nothing which is comparable in scientific plan and in wealth and completeness of information to that offered by the volumes here considered.

This book is a text comparable to one that might have been prepared by a group of able engineers for the prosecution of their own practical ends. Its terse, telegraphic language, resembling

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somewhat the style that has been adopted by the magazine *Time*, has been written strictly for use rather than for literary delectation. The illustrations, likewise, are designed for a wholly purposeful objective, rather than as an art gallery; yet withal the colored plates compare creditably with more grandiose attempts in the direction of bird art that have appeared in recent American ornithological books.

In order to indicate the relative thoroughness of treatment in this British work, the reviewer might ask in what *single* book on North American birds the following categories of information can be sought: habitat; field characters and general habits, these including notes on the gait, type of flight, nature of resting or perching places, etc.; voice, with reference to song and to call notes of every kind; courtship, posturing, display, technique of recognition, injury-feigning; breeding, including detailed information about the nest, eggs, the season, whether incubation and feeding of the young are undertaken by one or both parents, the length of incubation and nestling life, and the number of broods the species rears annually; food, with analyses rich in detailed and specific information; distribution, both in Great Britain and abroad; description, with reference to birds in all stages of growth and seasonal phases; relationship to allied forms outside the British Isles. Some of the color plates depict as many as five plumages of a single species, and the descriptions extend to nestling down, the color of the inside of the mouth, etc. Only the weight of birds is lacking, doubtless because of the paucity of such records to date.

The consistency with which the structural pattern is followed, often with greater fullness than can be suggested by the headings quoted, is an indication of the important place that

this work will long fill, both as a book of reference and as a model applicable to students in all other parts of the world. As stated in the original prospectus of the 'Handbook,' it was designed as an exhaustive book of reference and arranged so uniformly that it might be consulted with ease on any point about any species. The mine of factual matter in the older literature on British ornithology has been comprehensively tapped and brought up to date, and a wealth of new information has been added with particular reference to the modern point of view of ecologist and behaviorist. Coöperation and clear integration are the key-notes throughout; the various intermingled parts of the text are initialed by the responsible authors.

The illustrations are of two sorts, each of which amply fulfills its object. The first group comprises line drawings illustrating technical details of taxonomic importance, and maps relating to migration and distribution; the second comprises the fully inclusive and attractive portraits in color, which are arranged uniformly four to a page, and which enhance the usefulness of the work no less than its attractive appearance. There are in addition a liberal number of halftone reproductions of drawings and photographs, which include such interesting subjects as the specific characteristics of owl pellets, the nest feathers of various geese, and the ejection of rightful eggs from a nest by the newly hatched cuckoo.

A chart of song-periods of British birds in the first volume is a feature of special interest. It is notable that, of all the species listed, the serin is the most persistent and nearly continuous songster throughout the year, which indicates that domestication of this species as the most popular of all occidental cage birds (the canaries) was not a matter of chance.

AUDUBON MAGAZINE

The final volume has a section of addenda, more supplementary than corrective, and a convenient systematic and distributional catalogue of all the 520 forms of birds "fully admitted to the British list" including, of course, Ireland. An index to all five volumes concludes this notable work.

UNDER THE SEA-WIND. By RACHEL L. CARSON. Illustrated by HOWARD FRECH. Simon and Schuster, New York, 1941. 314 pp. \$3.00.

Reviewed by
RAYMOND S. DECK
Author, 'Pageant in the Sky'

The pulsing waters of our Atlantic, with their coast, are the empire of a picturesque society: one of ghost crabs and sharks, waving seaweed, phosphorescent shrimps and jingle shells. Various shore birds passing rhythmically between Argentine pampas and the Canadian Arctic are one strand of a life-web anchored to the sea.

In her welcome book, 'Under the Sea-Wind,' Rachel L. Carson gives us as no one has done with such roundness before, a popular narrative of interwoven lives in this salty world. Casting famous travelers as the stars of her three inclusive accounts—Silverbar, the Sanderling; Scomber, the Mackerel; and Anguilla, the Eel—she describes most informatively the encounters of these characters with innumerable other creatures of the ocean cosmos.

Miss Carson, a marine biologist by profession, has fashioned a book that is thoughtful as well as revealing. Through views of private lives in Davy Jones' locker and on tide-washed sands, she makes the reader sympathetically aware of the inexorable rhythms, at once terrible and beautiful, by which glassworms, jellyfish and whales alike, successively are eaters and eaten. Recurrent attention to this principle, without any garnish of verbal molasses, begets an effect.

The author's sensitive pictorial prose greatly enhances the charm of 'Under the Sea-Wind.' Here and there, amid rather tall piles of scientific facts, one is delighted by slivers of spontaneous poetry, as when on Arctic tundra we hear "bees trampling the shiny golden petals" of buttercups; as when at sea we behold swimming "hordes of crustaceans that browse in the diatom meadows. . ."

Miss Carson's first book, fresh and original in conception, provides a wealth of lightly dealt information. Howard Frech's full-page illustrations complement the author's words here to crystallize the boom of surf and the hiss of breaking waves.

A-HIKING WE WILL GO. By JACK VAN COEVERING. Illustrated with 100 photographs. J. P. Lippincott Co., Philadelphia, 1941. 214 pp. \$2.50.

Reviewed by
DOROTHY A. TREAT
Junior Club Secretary, National Audubon Society

Here is an excellent children's book relating the adventures of boys and girls of varying ages, friends of the author, who explored an ocean beach, climbed a mountain in Colorado, and roamed the fields and woods of Michigan. Besides the stories of ten fascinating nature hikes, the volume contains 100 fine photographs of the children and the things they saw and did during the course of their adventures.

It is refreshing to find a children's book that approaches nature study from the point of view of adventure, exploration and discovery—the fun of observing living plants and animals, of seeing for one's self. The element of surprise, the unexpected, ever present in the field, is vividly developed in the narrative account of these hikes, particularly in that of the trip through the marsh. Rather than present the more hackneyed, arbitrary sort of

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nature walk, limited to bird, flower or tree study, Mr. Van Coevering has his children visit different types of habitat and, with eyes, ears and minds alert, observe the plants and animals that are discovered living together in one environment.

Absent from this book is the over-worked idea that nature study consists first of all in naming things. There is so much to be learned from watching living things that names alone are far from satisfying. Although many plants and animals are named and pictured, this is not intended to be a book for identification. It is rather a guide to the enjoyment of making discoveries about the inhabitants of field and wood.

Boys and girls from six to sixteen will be stimulated to go hiking for themselves and see and discover the wildflowers, birds, toads, frogs, snails, deer, porcupines and other creatures which the children of Mr. Van Coevering's volume found on their hikes.

Briefly Noted

Our American Game Birds by Van Campen Heilner. A reference book for sportsmen by a sportsman, giving brief accounts of the game birds of the Western Hemisphere. Most readers of AUDUBON MAGAZINE will find little in the text which they cannot find in numerous other books in their own libraries, but the nineteen large full-color paintings by Lynn Bogue Hunt will probably be the chief inducement to add this large volume to their shelves. There is a series of full-page range and migration maps in a chapter entitled 'What Is Behind the Waterfowl Regulations?' by Gabrielson and Lincoln. (Doubleday, Doran & Co., Inc., New York, 1941. \$5.00.)

A Lot of Insects by Frank E. Lutz. The author of the 'Field Book of Insects,' which to date has gone through nineteen printings, writes about his adventures with his six-legged 'guests' in his garden near the center of a suburban New York town. Over the years, Dr. Lutz has recorded more than 1400 species there. He digresses to tell facts of interest and to expound some of his ideas. Highly recommended to bird people, who usually know all too little about the insects on which birds depend. Illustrated with photographs and line drawings. (G. P. Putnam's Sons, New York, 1941. \$3.00.)

Henderson—Home of Audubon. One of the American Guide Series compiled by workers of the W. P. A. Although Henderson is interesting in many ways, its chief claim to fame is that it was once the home of Audubon, and now possesses the only Audubon Museum in the world, a medieval-looking stone building in the very hills where Audubon once roamed. Illustrated. (Bacon, Percy & Daggett, Northport, N. Y.)

Trees of the Eastern United States and Canada by W. M. Harlow. A handy little volume which covers the identifying features of trees, their woodcraft uses and their importance to wildlife. Most of the technical botanical language is omitted for the sake of the average hiker or camper for whom the book is intended. Illustrated with many black and white photographs and a few Kodachrome reproductions. (Whittlesey House, New York, 1941. \$2.75.)

Cbeechako by Edgar M. Queeny. The story of an Alaskan bear hunt. A gift item for the collector of books on hunting, illustrated with decorative end maps and black and whites and Kodachromes of the magnificent Alaskan landscape and its wildlife. (Charles Scribner's Sons, New York, 1941. \$7.50.)

For the convenience of our readers, all books listed above, with the exception of State and Federal publications, may be purchased from the Service Department of the NATIONAL AUDUBON SOCIETY.

What Does My National Audubon Membership Mean To Me Today?

By Grace T. Lewis*

I AM a share holder in a great national enterprise that not only helps maintain the American Way of Life but makes it more abundant for millions of fellow Americans now and in the years when peace will come. Alone, I can do little. As a member of a group of like-minded individuals, I share in the restoration of some priceless values of rural life we have lost in the hurried mechanization of our age. Humanity needs the labor as well as beauty of our birds, and our constant care is their only protection.

But I pay my dues with a more personal feeling than this, really—a different feeling than I experience from belonging to any other organization. I'm only an amateur but I buy a proprietary interest in every bird I see—swinging on a cattail in a quiet marsh, or insistently tapping for grubs upon my elm. I've bought the safety of numberless feathered friends who appropriate my fruit and berries or preen themselves after bathing in my pool. But for me, they would be less protected and less free to travel as the seasons pass. And, when their bright eyes peer fearlessly into mine through the intervening leaves outside my bedroom window as we both stir with approaching day, I humbly ask: "Who am I to begrudge the toil that earned the paltry sum which keeps them flying?"

My membership—such is the magic of money—is not counted in dollars but in birds, my birds who share my home and help to make it home. And then, when the days begin to shorten, I like to think they wing their way to a fellow member to do for him what they have done for me, stirring gratitude for such gifts from a generous Providence.



*The National Audubon Society takes pleasure in announcing that Miss Lewis, Dean of the Davis High School, Mt. Vernon, N. Y., has won first prize in the contest recently sponsored by this Society on the subject, "What Does My National Audubon Membership Mean To Me Today?" For many years Miss Lewis has been an active and loyal member of the National Audubon Society and has taken a particular interest in this Society's current campaign to end all traffic in wild-bird plumage. Other winners, whose essays will appear in forthcoming issues, include: Second Prize—Miss Emily R. Denton, 413 Church Street, Herkimer, N. Y.; Third Prize—Mrs. H. J. Dunbaugh, 993 Green Bay Road, Hubbard Woods, Ill. Honorable Mention has been awarded to: Miss Constance F. Hughes, Connecticut College for Women, New London, Conn., Mr. Clinton G. Abbot, Natural History Museum, Balboa Park, San Diego, Calif., Mrs. Shippin Lewis, 8018 Navajo Street, Chestnut Hill, Pa., Miss Florence Zinmeister, 293 Seneca Park Ave., Rochester, N. Y., and Mrs. Howard Russell Butter, 107 Library Place, Princeton, N. J. The judges for the contest were Guy Emerson, President of the National Audubon Society, John Kieran, Director of the Society and nationally known for his radio appearances and writings, and Donald Culross Peattie, Contributing Editor of AUDUBON MAGAZINE, as well as one of the country's outstanding authors on nature subjects.

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Gleaned from Bird-Lore 25 Years Ago

TURNING back the pages of BIRD-LORE 25 years to the issue for January-February 1917, we note the concern, then as recently, over condor quills making their way from South America to fashionable millinery establishments. Dr. Frank M. Chapman described his meeting, in Argentina, with a condor hunter who claimed to have been responsible for the destruction of 16,000 of these magnificent birds. "Only the wing- and tail-quills have a commercial value . . . they usually number 84 . . . and for these feathers the price paid prior to the war was twenty dollars." Most of the birds were caught with nets baited with a dead horse; the largest number ever taken at a single 'throw' was 64. Although Federal law then forbade importation of condor feathers, fashion had set its price and violations occurred until the Society renewed its campaign to end U. S. commercial traffic in all wild-bird plumage.

Writing from the battlefield of Flanders in World War I, Major Allan Brooks commented that, almost without exception, birds showed complete disregard to cannon fire, blackbirds and Nightingales singing uninterrupted through the din. A Green Sandpiper, made nervous by shells, made no attempt to leave the scene. Complete cessation of all hunting of game birds and animals in the war-zone was ordered for the war's duration. Natural enemies of birds, especially rats, increased. Major Brooks noted that birds usually paid no attention to aircraft.

Results of the Seventeenth Christmas Census indicated that an invasion of irregular winter visitors would mark the winter of 1916, as it has that of 1941-42. Outstanding was a flight of Brown-capped Chickadees (67 individuals reported) which came south in unprecedented numbers, with southernmost records from Staten Island, N. Y., and the vicinity of Plainfield, N. J.; we have had to wait for just a quarter of a century for repetition of such a flight. Correlated with this movement was a great increase in Black-capped Chickadees, again noticeable in 1941. Pine Siskins were noted south to Georgia, and White-winged Crossbills appeared sporadically to Virginia. Redpolls were abundant generally. As was the case this winter, Evening Grosbeaks invaded the East to southern New Jersey (to Scranton, Pa., in 1941). It was a flight year for Goshawks, and indications are that they are now on the southward move again. The longest list was obtained in San Francisco (65 species, as against Charleston's 124 in 1941). A total of 161 censuses was published from 36 States, 1 Canadian Province, and the District of Columbia.

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Among the Authors

Adolph Murie (p. 3) says his most interesting national park assignment was a recent study of wolves, bighorns, caribou, etc., in Mt.



McKinley National Park, the manuscript of which is now in preparation. This took him back to country in which he worked during 1922 and 1923 while assisting his brother O. J. Murie in a study of Alaskan caribou. From his native Red River country in Minnesota, he went to the University of Michigan. After completing graduate work there, Dr. Murie remained for some time as Assistant Curator of Mam-

mals in the Museum of Zoölogy. During this period, field trips were taken to Isle Royale to study moose, to Guatemala, and to various parts of the West. Since 1934 he has been employed as a field biologist with the National Park Service and more recently with the Section on National Park Wildlife in the Fish and Wildlife Service. Outstanding among accomplishments of this time was publication of an ecological study of the coyote in Yellowstone.

John Laurence Murray (cover) cannot remember when he did not want to paint, and for the last four years his brush has seldom been dry or his pencil dull.



First assignment came during his second college year at Compton, Calif., for a teal painting, whereupon he decided to make freelance bird art his career. Says artist Murray, "Even with its struggles, which I have hardly begun to encounter, it is still the most thrilling and soul-satisfying job a fellow could wish for."

Working wherever possible from live specimens, he first exhibited water colors at the Boston meeting of the American Ornithologists' Union in 1940; a western exhibit is scheduled for the near future.

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